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Across disciplinary boundaries towards a sustainable life: psychodynamic reflection on human behaviour ; dedicated with eternal gratitude and in high esteem to Prof. Dr. Rainer Fuchs

Stuhler, Elmar A. (Ed.); Misra, Shalini (Ed.)

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Elmar A. Stuhler & Shalini Misra (Eds.):

Across Disciplinary Boundaries Towards a Sustainable Life. Psychodynamic Reflection on Human Behaviour.

Dedicated with Eternal Gratitude and in High Esteem to Prof. Dr. Rainer Fuchs

Research on Cases and Theories, Volume 12, edited by
Micheal O Suilleabhain, Elmar A. Stuhler, Dorien J. DeTombe
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The contributions in this book are fairly heterogeneous. They belong to a relatively large number of disciplines and / or sub-areas of certain disciplines. They contain problems and practical aspects of their possible solutions, strategies, methodologies and concepts as well as theories (see Part 1 – 8). We all know that it is difficult to link such problem solving processes to bigger units. It needs the steady development of an appropriate awareness of a problem or conflict, i.e. consciousness. Such "networking" should not be left to journalists alone, but should rather be integrated into higher education and research related to Sustainable Development or Sustainable Life, in short Sustainability.

Our survival seems to be threatened by various developments and complex problems. The Climate Change System and its consequences for ecology, economics and society, for example, is proclaimed to be one of our new enemies (Part 9). Experts suggest that stopping such negative trends could be possible through a change in human behaviour and through "reversals" in the connected systems or sub-systems. Attempts to get closer to this far reaching goal can be found in the articles of this book. But how can people be persuaded to change their behaviour?

Changes of behaviour (human action) depend on human motivation. How can motivation be diagnosed in relation to Sustainability? One can assume that the theory of achievement motivation, its establishment according to learning rules, its activation depending on associations and its adaptation to reality through the experience of success or failure in motivated actions is a valid platform to build on. The sustainability-imaginative stories written by students, for example, demonstrate the manner in which the structured rules of motivated learning and acting are put in concrete terms (Part 10). We consider them to be an innovation, worthy of being tested and further developed so as to contribute to the creation of new motivation in and for Sustainability. Solving complex problems and conflicts is the content of another paper. Applying and testing the underlying psychological theory to economic / agribusiness problems / conflicts and their action programmes has been intended (see also Part 10).

Key words: Sustainability, Survival, Responsibility, Multi-Disciplinarity, Diagnostics of Motivation, Imaginative Stories

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Volume 12

edited by
Micheál Ó Súilleabháin, University College, Cork
Elmar A. Stuhler, Technical University of Munich
Dorien J. DeTombe, Delft University of Technology

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* * *

Rainer Fuchs

Professor Rainer Fuchs is professor emeritus for educational studies at the Technical University of Munich.

Psychology as a science of action and of education, concerned about the ability to act and the culture of action, about competence and virtue, about individual and social learning, vocational training and education, about the reconciliation of *homo faber* and *homo ludens*, about progress and tradition – which included the airing of academic robes without actually ditching them – those were, and partly still are, the main topics of Rainer Fuchs. Recently, he has completed a case study on performance motivation.

He has been, and still is, dedicated to his scientific work and teaching with heart and soul, an alert mind, a rich imagination, while doggedly insisting on basic principles. Wherever he could bring all these characteristics into play, he found the challenges he could pit his wits against. With his contribution to the function analysis of motivation at the notable Tübingen Symposium of 1963, pioneering work on the theory of information and innovative contributions to the dimensions of learning, he set milestones for the development of motivation, cognition, action and learning theory. Scientific research and academic teaching became a way of life as he studied mathematics, physics and psychology, did his doctorate in physics and his habilitation in psychology, worked under Wernher von Braun in Peenemünde, represented the “habitat of science” during the Nazi period of power and worked as a teacher after World War II. It has been keeping him awake and alive till now. In the wake of his habilitation on “Certainty, motivation and conditioned reflex”, he participates in the dialogue on current issues revolving around the brain and the human mind. His performance motivation is the more admirable for the fact that, because of an eye operation, he can only do his required reading with great difficulty. No meeting with him remains without stimulating talks and touching stories: an encounter with Rainer Fuchs brings great joy. All who share this joy call out: good luck to you and your family!

Prof. Dr. Karl-Heinz Leist, Emeritus TUM

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The authors have sole responsibility for the content of contributions.

Introduction

Inga Krättli*

Long-term Responsibility for a Sustainable Life: Introductory Panel Session and Roundtable Discussion

1. Introduction

The WACRA 2002 topics of *responsibility* and *sustainability* clearly demonstrate our mutual concern about the dramatic changes that our societies are confronted with as the third millennium begins. Managing current evolutionary processes, including the recent expansion of terrorism, war crimes, and severe government and management corruption cases requires a deeper understanding of the underlying causes and the material and non-material consequences brought about by such unpredictable developments besides the ethical issue of responsibility. From systems science we know that evolution is always compensatory in character, the result of which is selection. So, our concepts of viability and sustainability need to be redefined.

Using General Systems Theory we achieve both knowledge of the organization within systems and the understanding of the effects of different reinforcement contingencies in the development of social cooperation. The co-actions between evolution and transformation of living systems associated with the eco-systemic logic effect and environmental fluctuations determine the history of life and the structure of the eco-space. This involves integrated multi-level effects, all of which are dependent on their primary motive to survive.

Evolution and transformation are driven simultaneously by an internal genetic and bio-chemical logic as well as by social and external selection factors, such as eco-systemic or environmental effects, climatic and energetic changes, stress and shocks. This raises the question about how to respond to nature's tricks for its own survival. In this effort, we will try to develop a theoretical basis for the complementary relationship between the regulatory and dynamic aspects of formal and material components of reality as reflected by time-space and whole-part complementarities. This includes the topics of evolution and complexity as well as an eco-systemic and political approach.

2. American Success, not the American Way

If we agree that in an open, constantly changing society all forms of politics are determined by interests, we cannot ignore the fact that our consumer society's pursuit of happiness has led to an excessive dilemma. It is this democratic alliance of freedom and power; an alliance where the power of the state is put to the service of individual freedom, which has become a major problem. Unless the foundation of politics is made up of conscious, self-guided individual responsibility, we will not overcome the current degeneration and ultimate destruction.

* Prof. Dr. med. Dr. phil. Inga Krättli, COLLEGIUM HUMANUM Switzerland, Im Bielti, CH – 3983 Goppisberg, Switzerland, Tel. ++41 1141 27 927-3770, Fax ++41 1141 27 927-3772, e-mail: docuSwiss@spectraweb.ch, Homepage: www.Collegium-Humanum.ch

2.1 Participation

Human life is characterized as group life. As members of a society, we are automatically participants in various groups, organizations, and cultures. Socialization can be defined as an interactive process whereby an individual's behavior is modified to conform to the rules or standards of the groups to which he belongs (R. L. Burgess & D. Bushell, Jr., 1969). The socialization process re-quires the acquisition of knowledge, ability, and motivation which usually occurs within the confines of a group. Learned behavior is the result of intense face-to-face social interaction. As children, we primary learn to be part of a social entity. It is in groups that the social nature of human beings is refined and developed.

As members of societal systems we partake in social and political decision-making in its widest sense. Therefore, solidarity and teamwork are important factors in every social organization (A. Birenbaum & E. Sagarin, 1976). Living and working with others imposes certain social criteria on the performance of a task, which depends on our willingness to appear physically or virtually, to act and react, and to perform in a way that the risk of failure is limited. The success of social performance largely depends on the personal qualities and abilities of the participating members. As such they are automatically subjected to be judged for their contribution toward sustaining a community, achieving objectives, and coping with the uncertainties involved.

Democracy is built on people's votes. The *responsibility* involved requires awareness of the participants' role in the process of selection and election. If we do not use our individual voice because we feel helpless or consider our single voice as irrelevant or even negligible, we ignore our personal space for individual freedom. It is here where education should start. It is the majority which counts, and we represent one essential voice in it. Thus, we have to be concerned about the procedures for elections and whether they occur in compliance with constitutional laws. The negligence of this *democratic responsibility* can have drastic consequences. This was clearly demonstrated during George. W. Bush's election, where many votes from Florida had been deliberately ignored.

This means that our first responsibility is to actively participate in socially relevant events. Any form of isolation or retreat would be irresponsible. Representing a subsystem within a ″supra-system″ requires:

- Identification of the structure of the whole system;
- Recognition of personal boundaries as well as the boundaries of the supra-system;
- Finding the level at which we operate in the hierarchy of the system;
- Evaluation of our personal roles and functions at each level.

2.2 Acquisition of Information as a Learning Process

As we participate, we are active parts of a larger system, regardless of whether it is voluntary or involuntary, conscious or subconscious. As such, we represent the individual and the community simultaneously. As individuals we act as ethical self-constructors who develop conceptions for various roles (Vincent Luizzi, 1994). Being members of social groups or organizations, we are subjected to rules and functions, or we can choose them during participation. Thus, any participation requires the ability to make decisions and to respond to the information which sustains and controls the system (G.A. Swanson).

The way in which regulation occurs is evident even in the most familiar types of behavior. Since our behavior is controlled by information, we have to acquire knowledge about the facts, processes, and consequences that are involved in our activities. By this, we assume that we are prepared for and interested in receiving the information relevant to our performance and actions. Since an individual can hardly control the incoming information, a great portion of social behavior is under discriminative control. Thus, the aim of any form of educational enforcement or incentives involves double contingencies.

Psychological experiments have shown that a particular behavior is maintained in compliance with the social consequences or the attention it produces. Thus, it is the acquisition of knowledge and learning from this knowledge that enables us to consider different perspectives and to make reasonable judgements about the received information. It also helps us to extend our efforts from an idiosyncratically measured perspective to the complexity of a wide range of group phenomena. Since we all belong to social, national and cultural groups, we exhibit a certain kind of adopted group behavior.

Belonging to a group establishes membership. When entering a foreign group we are looked upon as strangers. Strangers generally exhibit what Goffmann calls *civil inattention* following an implicit set of rules concerning physical distance and appropriate forms of address (E. Goffmann, 1967). The rules about social distance are taken for granted and often not noticed until they are violated. This involves the problem of interpretation. Performing in accordance with generally accepted rules makes it essential to know that *any interpretation* of the exhibited and received information is subjective. Subjectivity can hardly be quantified. Therefore individual responsibility implies tolerance, patience, and reasoning to achieve the highest degree possible of objective knowledge of the facts. Living and learning is an ongoing coherent process which cannot be divided into fractions.

General Systems Theory provides us with the knowledge of the basic principles of the underlying structures of a group system in order to

- Improve communication skills for correct transfer and/or receipt of the information to be expressed in language, behavior or other symbolic actions;
- Conceptualize logical relationships and influences from inside and outside of the involved systems;
- Improve our capacity to integrate these insights into reasonable and responsible actions.

2.3 The Meaning of Responsibility

Public order depends on cooperative activity as well as avoidance of dangerous situations. Responsibility is supposed to create a climate of peaceful togetherness and trust towards each other, built on certain expectations of stability. The so-called *Good Society* in democratic countries is supposed to act and react in compliance with respective rules. If we interpret such a society as a democratic system, there must be an institutional mechanism to sustain it. Such a representative democracy is a government of the people, by the people, and for the people (Yong Pil Rhee, 1982). To be a stable democratic system, it must be deemed legitimate by the people.

Since the democratic system rests only on the consent of the governed as a result of effective performance, *it will not be valued* by the people unless it deals effectively with social and economic problems and achieves a mode of order and justice. Such legitimacy requires a profound moral commitment and emotional allegiance. Thus the respective political or any other organizational institutions are treated in terms of their functions and outputs, and therefore, these can be seen as open and adaptive systems. The logic behind the idea of an open system makes it necessary to develop concepts that enable us to handle the analysis of exchanges between a system and its environment (Karl. W. Deutsch, 1974). By providing these concepts, General Systems Theory has contributed greatly to the achievement of order from chaos and to create meaning where it had previously not existed (James Grier Miller, 1978).

Humans respond not to events but to their meanings (Jerome D. Frank, 1967). From the famous psychoanalyst *Victor Frankl*, who invented the science of *Existence Analysis and Logo Pedagogy*, we know that responsibility implies our finding meaning in our actions. His publications *Man's Search for Meaning* and *Man's Will to Meaning* demonstrate clearly that if we do not find meaning in our existence, particularly during dark periods, we are unable to take responsibility for our life which then can end in destruction or even suicide. Since any individual system is part of a social group and ultimately of the one world society, we can transfer his conclusions to our search for a sustainable future. Suicide bombers, who are surprisingly often neither poor nor uneducated, cannot find meaning here on earth.

Without an understanding of personal meaning, people easily become victims of manipulation, be it religious, political or personal. Instead, we must commit ourselves to take risks and initiatives and to be motivated:

- To analyze thoroughly what appears complex: by using quantitative empirical methods and data analysis, based on factual information;
- To look for the key not where the light is, but rather where the key was lost;
- To recognize that we can only act as purposefully as our orientation toward future goals allows us;
- To construct measurable patterns of a sustainable future;
- To build up controllable instruments in order to safeguard our actions and to secure the boundaries.

2.4 The Problem of Control and the Role of General Systems Theory

We, herewith, approach the problem of control. Social control, involving both informal practices and formal rules, operates in various ongoing settings. Social organizations vary in their need to enforce the norms concerning social solidarity and in their efforts to ceremonize the process of becoming a member. Social control is primarily a way of keeping in line those who do not present overt indications that they are not living up to the expectations of others. In this sense, social control may be conceived as an informal interpersonal practice in groups, which implicitly strengthens the bonds of social cohesion while being overtly aimed at persons who may even be beyond the scope of the group's power to control, which is the case in our current anti-terrorism efforts.

Given the cultural diversity involved in global activities, the increasing complexity of society as a whole makes systems difficult to understand and consequently to control. Hence, control is and will be the future challenge for science. Actors use models of social systems to judge the state of a system, to choose appropriate solution strategies, and to evaluate the success of the selected strategies. Thus, the process of social control has its greatest impact upon those persons actively engaged in controlling the system. It is largely a preventive activity, a warning to those who may waver, rather than an effort to root out deviance. This means that the ability to predict the course or changes of future events mathematically does not necessarily lead to control.

In democratic systems, legitimacy involves the ability of the system to engender and maintain the popular belief that the existing political institutions are the most appropriate ones for society. Thus, the essential variables of democratic sy-stems, namely the allocation of values to a society and the relative frequency of compliance with them, are closely related to the stability of a democratic system over time. If systems are able to persist in a world of macroscopic evolutionary processes, they must be prepared to change and be capable of adapting themselves to fluctuating circumstances. A merely evolutionary perspective focuses too much on the mechanism of selection.

Evolution is more than just an order of change. Rather, it represents the self-organization of different processes at a higher level. We can say it is the ordering of the order of change. According to Yong Rhee, it is *evolution, the coming into being of a new and higher order of process*. The main focus of General Systems Theory is to provide insights in these dynamics. This kind of knowledge is the *conditio sine qua non* for control. But the application of this knowledge again calls for responsibility in its widest sense. What should be recognized, if not widely admitted, is that no remedy is likely to be effective if remedies are not universally applied. The problems are global, and local expedients will not remove them (Errol E. Harris, 1993). During the past decades, science has provided us with tremendous sources of knowledge, which simultaneously gives us the power to control. Herein lies the threat of the century, but also the greatest advantage for us

- To realize its potentials and to accept the challenges that lie in its dangers;

- To expand the quality of life by willingly and consciously using our gained potential in constructive ways;
- To learn the laws of self-control;
- To acquire the ability to adjust ourselves and to improve our modes of adaptation, thus increasing self-regulative mechanisms;
- To practice value assessment and sense of justice;
- To avert mass destruction and ultimately expel war

3. The Dual Logic of Sustainability: Survival or Growth?

During the past decades, sustainable development has increasingly become a concept and a central political issue in developed as well as in developing countries. In Stockholm (1972) and in Rio (1992) leaders from all over the world talked about a modulation of actual activities to allow compatibility between the economic, socio-political, and cultural functioning with our planet's environment. Discussions about co-action and adaptation measures were meant to ensure the future of following generations, taking into consideration poverty and alienation with respect to the rights of the individual. However, the demonstrated goal for some kind of global homeostasis stands in clear contradiction to the individual's as well as whole nations' goal for a secure and *constant economic growth*.

The abilities required to survive a crisis are *not only different* from those required to achieve growth, but they are *diametrically opposed* to them. Market forces are based on positive feedback processes and hierarchical forces upon negative feedback processes. Culture, as a source of stability in social life, represents one of these negative feedback conditions. Hence, the shift from mere survival to growth requires a complex reversal of priorities. Success at one stage can contain the seeds of future disaster, for the capabilities that are required to achieve growth will, if carried too far, bring the system into the opposite situation. This vicious circle can only be broken by replacing the survival imperative of the turnaround phase with a new and compelling imperative for the growth phase.

The transition from the survival mode to a high performance ethic is essentially a race against time, where speed of actions becomes more important than their quality; judgement more important than analysis, which makes it necessary to go into a turn-around situation with the solution already prepared. Turnaround phases involve the psychology of survival, where the issue of ethics is often ignored. *Whose potatoes you eat does not matter, as long as you get some,* stated the CEO of a big Swiss company in 1995 (Hans Widmer, Oerlikon-Buehrle, 1995). As Widmer suggested: "a *system can only survive the turnaround phase if it manages its shift into the developmental growth phase fast enough, where excellence should replace survival as imperative".* Unlike in mere survival phases, development and growth are not dictated by external circumstances, but by the systems' will to create a successful future.

Hence, we deal with a dual implication in democratic societies. Though clearly capitalistic, this philosophy holds some interesting implications for the issue of

sustainability. Either phase, be it merely survival or growth oriented, imposes positive and negative feedback loops. A negative feedback loop is goal-seeking (Widmer's development phase) with the tendency to regulate the system toward some objective, thereby involving the issue of motivation and meaning for participants. In contrast, the positive feedback character is goal-divergent with the tendency to depart exponentially from some point of instability (Widmer's survival phase). Thus the positive growth loop can only be controlled by negative feedback. This again shows the superiority of meaning for sustainable development.

In this context, the Herald Tribune raised an interesting question (May 9, 2002): *Democracy or Anti-Terrorism?* This raises the question of value assessment and sense of justice which we have discussed in the context of responsibility.

- What do we want to maintain?
- Assessment of values?
- Is the current state of order: positive, constructive, desirable, compliant, satisfying?
- Why do we attribute these qualities?
- Where are the boundaries between subjective and objective judgement of a status quo to be drawn?
- How do we set priorities and weigh all possible consequences?

4. Conclusion

The main goal of this conference, as I understood it, is to provide the basic principles for a rational discussion and to learn how to maintain a sustained and coherent society where mutual value assessments can become acknowledged worldwide. We aim to demonstrate that the inner logic of a successful lifespan remains the same, and that it is only the historic circumstances of the maintenance required change. Many of our society's actual problems are homemade, like the unemployment rate in many countries of the world.

Sometimes radical changes in politics can bring a reasonable solution, yet politicians as well as citizens are often too afraid to initiate these changes. If there is a problem, we certainly have to analyze the situation and to search for practical alternatives. But these problems should never become emotionally abused issues for conflict among government parties during elections, as it is currently the case in Germany. In this context, it is important to realize that even our best intentions do not allow us to use control in order to interfere in self-regulative processes of nature in a way that would restrict the freedom of nature and evolution and destroy natural laws. If we pretend to take responsibility for our actions, this statement should be seen as *the first commandment* and for religious people as an interpretation of the first commandment.

In this sense, it is important to understand that neither abstract generalization nor merely materially oriented sustainability, which means constant growth, can resolve our actual problems. But we still tend to think we can get along quite nicely while ignoring the effect that our behavior has upon the environment. We are reluctant to give up our habits of exploiting natural resources for our own immediate

convenience, without consideration of the consequences. As long as individual participation is determined by common interests, it will always be the community which these individuals belong to that motivates them to take responsibility for a sustainable future, but only to the extent given by the conditions of their community.

It is the relationship we participate in, not as individuals but as members of a community, that imposes reflection. If we accept that the universe is a single whole, that nature is one system of interdependent parts, and that humankind is totally dependent on maintaining the balance of nature for its survival, it becomes clear that the measures to be adopted must be global in scope, which leads to the following roundtable discussion which will hopefully provide us with more insights into the topics of sustainability and responsibility. Solutions and preventive measures could include:

- To erase chronic budget deficits and governmental debts,
- To minimize subsidies for one social group,
- To increase local labor potential by supporting small businesses,
- To improve lower education,
- To increase international liquidity in order to avoid local competition for rare resources, which leads to a breakdown of local liquidity
- To avoid sustainable trauma that leads to costs which lie far beyond normal recession,
- To build a new national financial architecture by supporting the private sector, establishing new rules of Corporate Governance, rules for more transparency, and improving financial surveys.

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Part 1

On Organisations and Philosophies of Development

Isolde M. Schönstein*

Die Verantwortung der Kirchen für nachhaltige Entwicklung

Summary

The Old Testament not only confronts us with the challenge of sustainability but also guides us to equip ourselves for that challenge. It is for the human agent to discern the intended ecological order and to adapt his stewardship of the earth accordingly. Awareness of this challenge has, however, been slow to surface in our time. Given that one-third of the earth's inhabitants are church members, the question arises regarding their share of responsibility for the despoliation of the earth.

To the extent that they are responsible, they differ from their naïve predecessors in that they are clearly aware of the global consequences of their negligent behaviour. Church leaders in our time initially failed to distance themselves from the progressive beliefs and value systems of the contemporary proponents of atomic power and bio-patenting.

However, the signs of the times were duly interpreted from a Christian standpoint. Pope John Paul II stands out as a watchman warning of an approaching ecological crisis. This he singled out, on the occasion of the World Day of Peace 1979, as a moral dilemma. His counter-challenge to this trend deserves to be read and re-read.

To their credit, Pope Paul VI and the Roman Synod of Bishops anticipated the secular warnings of the Club of Rome that followed in 1972. Texts such as Pope Paul's declaration on 'Justice in the World' and the statement marking the 80th anniversary of the encyclical 'Rerum Novarum' testify to this new departure. In the two decades thereafter, extending from Cardinal Döpfner's 1974 Declaration on 'The Church and the Environment' to the 1985 study of the Lutheran Church in Germany on 'Belief in the Creation and Responsibility for the Environment', the Christian response has taken root. Special mention must be made of the stark message sent out from the 1983 Vancouver meeting of the World Council of Churches (WCC) , and in due course this was boosted by the declaration of the Ecumenical Assembly in Basle in 1989 and subsequent WCC-inspired 1990 conference in Seoul.

The founding of the European Christian Environmental Network (ECEN) in 1997 represented a milestone of exceptional significance. Given our space constraints, the reader will hopefully accept our signpost referral to the relevant ECEN website. The concluding pages of my contribution convey some impression of the impulses that led to my own involvement in this inspiring work.

„Leben und Tod lege ich dir vor,
Segen oder Fluch,
ergreife das Leben,
damit du lebst, du und deine Nachkommen."
Deut 30, 19

* Isolde M. Schönstein, "ARGE Schöpfungsverantwortung", Vienna, Austria,
e-mail: argeschoepfung@utanet.at

Der Begriff der Nachhaltigkeit ist bereits im Alten Testament grundgelegt, wo der Mensch vor die Entscheidung gestellt wird zu wählen zwischen lebensfördernden Handlungen und todbringenden, zwischen Segen und Fluch. Eindeutig ergeht an ihn die Empfehlung: „ergreife das Leben, damit du lebst, du und deine Nachkommen".

Und das Alte Testament bietet auch Orientierungshilfe dazu an. Voll der mitgeschöpflichen und landwirtschaftlichen Anweisungen ist es, stets verweist es auf Maß und Ordnung, welche der Schöpfung innewohnen.

Das vorgegebene ökologische Ordnungsgefüge zu gestalten und zu verwalten ist Auftrag des Menschen. Wie sehr dies im Sinne der Nachhaltigkeit und eines umfassenden Lebensschutzes gemeint ist, geht aus der Noacherzählung hervor, die ein Lebensrecht für lebende und künftige Generationen, für alle Lebewesen im Bundesschluss Gottes mit Noach deutlich macht, „hiermit schließe ich einen Bund mit euch und mit euren Nachkommen und mit allen Lebewesen bei euch". Gen. 9,9 f

Verantwortung

Angesichts der rasanten Talfahrt in der sich die Nachhaltigkeit befindet - ich muss hier keine Auflistung vornehmen, wir haben die Fakten vernommen - stellt sich die Frage nach der Verantwortung der christlichen Kirchen.

Ein Drittel der heute lebenden Menschen gehört diesen Kirchen an, welche Rolle haben sie im Weltengeschehen gespielt, wie weit trifft sie Schuld oder Mitschuld am Artensterben, der Klimakatastrophe, Hunger und Krankheit, bis hin zum Tod ...

Einerseits sind die Kirchen an den Entwicklungen, welche zur ökologischen Krise geführt haben (als Nutzer landwirtschaftlicher Flächen, als Bauherren, Konsumenten, Energienutzer, Reisende...) nicht unbeteiligt, andererseits berufen sie sich auf die Sonderstellung innerhalb der Schöpfung.

Hier ist eine Klärung des Auftrages im Hier und Heute zu treffen.

Seit dem In-Erscheinung-Treten der ökologischen Krise muss vom ökologischen Menschen die Rede sein, der sich vom vorökologischen Menschen dadurch unterscheidet, dass er, von der ihn umgebenden Wirklichkeit bedrängt, zum Erkennenden wird. Alle Verdrängungsversuche scheitern an den Wunden die tagtäglich aufbrechen.

„Der vorökologische Mensch verhält sich zum ökologischen Menschen,

wie der Blinde zum Sehenden, biblisch betrachtet."

Der Sehende kann aus der Verantwortung nicht mehr entlassen werden, ihm ist es aufgetragen Konsequenzen zu ziehen.

Erkennen und Umkehr in den Kirchen

Fortschrittsgläubigkeit und ökonomische Prioritätensetzungen haben auch vor den Kirchen nicht Halt gemacht, wie z. B. aus einigen Stellungnahmen zur Atomkraft aus den 80-iger Jahren und zögerlichen Stellungnahmen zur Biopatentrichtlinie hervorgeht.

So wurden häufig Maßnahmen zur Nachhaltigkeit ökonomischen Überlegungen untergeordnet. Vielfach basierten Fehlhaltungen auf einem Mangel an Kenntnis von

Lebenszusammenhängen und dem Fehlen von Schöpfungstheologie und Schöpfungsspiritualität im Alltag der Kirchen, wofür u. a. Ausbildungsmängel eine bedeutende Rolle spielten. (s. Vorsprache Schönstein bei Kard. Ratzinger, 1966 !)

Die Trennung von Heilsverkündigung und Naturbewahrung, verbunden mit der Fixierung auf den Begriff „Umwelt“ als sekundäre Welt, hat Verwirrung in den eigenen Reihen gestiftet.

Erst die Auseinandersetzung mit einer alten/neuen Schöpfungstheologie und Schöpfungsspiritualität bereitete den Boden für eine sich daraus ergebende Verantwortung, einer Schöpfungsverantwortung.

Der gleichsam zum Sehenden gewordene Mensch ist stets im Zeichen des Kreuzes zur Antwort herausgerufen, zur Antwort in der Vertikalen Gott, dem Schöpfer, wie auch in der Horizontalen den Menschen und der gesamten Schöpfung gegenüber.

Kirchliche und päpstliche Aussagen als Antwort auf die Zeitzeichen [1]

Papst Johannes Paul II wird nicht müde auf die drohenden Gefahren hinzuweisen und zu ermahnen. Die Umweltkrise sieht der Papst in engem Zusammenhang mit der Innenweltkrise des Menschen.

1979 erklärte der Papst Franz v. Assisi zum Patron der Umweltschützer.

Anlässlich des Weltfriedenstages 1990 erklärte er die Ökologische Krise als ein sittliches Problem und wirft die Frage auf, ob es für die hervorgerufenen Schäden noch eine Abhilfe geben kann. *„Es ist offensichtlich*, so der Papst in seiner Erklärung, *„ dass eine geeignete Lösung nicht einfach in einer besseren Verwaltung oder in einem weniger irrationalen Gebrauch der Ressourcen der Erde bestehen kann“.*

„Auch wenn man den praktischen Nutzen solcher Maßnahmen anerkennt, scheint es doch notwendig, zu den Ursachen vorzudringen und sich mit der tiefen moralischen Krise insgesamt auseinander zu setzen, von der die Verschlechterung der Umwelt einer der besorgniserregendsten Aspekte ist“.

„Kein Eingriff in einen Bereich des Ökosystems kann davon absehen, seine Folgen in anderen Bereichen und allgemein für das Wohl künftiger Generationen mitzubedenken“..

„Oft gewinnen Produktionsgründe die Oberhand über die Würde des Arbeiters, und wissenschaftliche Interessen kommen vor dem Wohl der einzelnen Personen, wenn nicht sogar vor dem ganzer Bevölkerungsgruppen. In solchen Fällen ist die Verschmutzung oder die Zerstörung der Umwelt Frucht einer verkürzten und unnatürlichen Sicht, die bisweilen eine echte und direkte Missachtung des Menschen darstellt“.

Theologie, Philosophie und Wissenschaft stimmen in der Sicht eines harmonischen Universums überein, d.h. in der Vorstellung eines wirklichen „Kosmos“, ausgestattet mit einer eigenen Integrität sowie einem inneren und dynamischen Gleichgewicht.

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[1] Die Zitate in diesem Abschnitt sind (z. T. gekürzt) entnommen aus: Wolkinger, Alois, Erdethik. Zwischen „Niedertreten“ und „Pflegen“ – zwischen Zerstörung und Kultur, Wien 1996.

Diese Ordnung gilt es zu respektieren: die Menschheit ist berufen, diese Ordnung mit kluger Umsicht zu erforschen, zu entdecken und sie dann so zu gebrauchen, dass ihre Integrität erhalten bleibt.

Die Erde ist ein gemeinsames Erbe, deren Früchte allen zugute kommen sollen.

Es ist nämlich ungerecht, dass einige wenige Privilegierte fortfahren, überflüssige Güter aufzuhäufen, indem sie vorhandene Ressourcen verschwenden, wenn gleichzeitig unzählige Menschen im Elend oder auf der Ebene des Existenzminimums leben.

Es ist die dramatische Dimension des Ökologischen Problems selbst, die uns lehrt, wie sehr die Gier und der Egoismus, sowohl in ihrer individuellen wie kollektiven Ausprägung, der Ordnung des Geschaffenen entgegengesetzt sind, in die auch die gegenseitige Abhängigkeit voneinander eingeschrieben ist.

Die Begriffe von Ordnung im Universum und von gemeinsamem Erbe unterstreichen beide die Notwendigkeit eines Verwaltungssystems, das auf internationaler Ebene besser koordiniert ist".

Aber noch vor Erscheinen des Berichts des Club of Rome (1972) gingen von Papst Paul VI und der Römischen Bischofssynode 1971 Warnungen vor den Folgen einer unbedachten Ausbeutung der Natur, einer Umweltverschmutzung und eines unkontrollierten wirtschaftlichen Wachstums im Rahmen einer Erklärung „Über die Gerechtigkeit in der Welt" und des Apostolischen Schreibens „Octogesima adveniens" aus, u. a. heißt es hier:

„Neuerdings beginnen die Menschen ..., sich auf eine neue und tiefere Dimension ihrer Einheit zu besinnen, indem ihnen bewusst wird, wie Naturschätze, beispielsweise so kostbare Güter wie Luft und Wasser, ohne die kein Leben möglich ist, und all die Dinge, die zu der schmalen und gebrechlichen „Biosphäre" alles dessen gehören, was auf dieser Welt lebt, nicht unerschöpflich sind, sondern als einmalige und unersetzliche Ausstattung der gesamten Menschheit sorgsamer Pflege und des Schutzes bedürfen. (Nr. 8)

Überdies hat die Nachfrage der wohlhabenden – gleichviel ob kapitalistischen oder sozialistischen – Länder nach Rohstoffen und Energie (wie auch die schädlichen Wirkungen ihrer Abfälle auf Atmosphäre und Ozeane) ein solches Ausmaß erreicht, dass die wesentlichen Voraussetzungen des Lebens auf dieser Erde wie Luft und Wasser unwiederherstellbar geschädigt würden, wenn diese Höhe des Verbrauchs, dieser Grad der Verschmutzung und diese Schnelligkeit des Wachstums bei der gesamten Menschheit Platz greifen würde". (Nr. 11)[2]

Kirchliche Erklärungen folgten, v. a. im deutschsprachigen Raum Europas.

- 1974 nahm Kardinal Julius Döpfner anlässlich der Deutschen Bischofskonferenz Stellung zu „Kirche und Umwelt" und stellte für Christen eine ethische Orientierung auf.

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2 Zitiert nach: Wolkinger, Alois, Erdethik, Wien 1996, S. 195-196

- 1978 gaben die Schweizer Bischöfe einen Hirtenbrief zur Frage „Energie und Lebensstil, 1982 zum Thema "der Mensch und seine Umwelt" heraus.

Unter dem Titel „Zukunft der Schöpfung – Zukunft der Menschheit" veröffentlichte die

- Deutsche Bischofskonferenz 1980 eine Erklärung zu Fragen der Umwelt und Energieversorgung.
- Studienkonsultation der Konferenz Europäischer Kirchen 1982 „Das Seufzen der Schöpfung. Christen Europas auf der Suche nach ihrer Verantwortung heute."
- 1984 veröffentlichten die österreichischen Bischöfe eine Erklärung „Solidarität mit der bedrohten Schöpfung"
- 1990 widmete die Österreichische Bischofskonferenz dem Thema im Rahmen des „Sozialhirtenbriefes" einen Raum.

Eine gemeinsame Erklärungen der Deutschen Bischofskonferenz und des Rates der Evangelischen Kirche in Deutschland erfolgte 1985, welche bereits auf Ursachen und Lösungsversuche eingeht und eine ethische Herausforderung sieht.

- 1984 – Denkschrift zu „Landwirtschaft im Spannungsfeld zwischen Wachsen und Weichen, Ökologie und Ökonomie", Evangelische Kirche Deutschland.
- 1985 – Vereinigte Evangelische Kirche Deutschland veröffentlicht Studie „Schöpfungsglaube und Umweltverantwortung"[3]

Alle Theorie, alle Theologie braucht Umsetzung

Von großer Bedeutung und in gewissem Sinne nachhaltig ist der vom Ökumenischen Rat der Kirchen 1983 initiierte „Konziliare Prozess für Gerechtigkeit, Frieden, Bewahrung der Schöpfung" (GFBS).

Bedroht durch das atomare Wettrüsten der Weltmächte in den 80-er Jahren fanden sich zunehmend Menschen zu Friedensdemonstrationen zusammen. Den Demonstrationen von Hunderttausenden Teilnehmern folgten Debatten und schließlich Erklärungen von Politikern und Kirchen. Dies alles spitzte sich zum Zeitpunkt der Vollversammlung des Ökumenischen Rates in Vancouver 1983 zu, als es auch klar war, dass Friedenssicherung mit Gerechtigkeit zu tun hat und diese nicht nur durch ungleiche Verteilung, sondern vor allem durch risikoreiche und irreversible großtechnologische Eingriffe und landwirtschaftliche Monokulturen, Verkehr und Industrie im Allgemeinen, gefährdet ist.

Wovor es dem Abgeordneten des Business Council, Herrn Schmitheyni, aber graut, ist, „dass wir es zunehmend mit neuen Flüchtlingsbewegungen, nämlich Ökoflüchtlingen zu tun haben werden und, dass, wenn wir nicht in Freiheit handeln, Ökodiktaturen entstehen, die, entsprechend ihrer Vorbilder in der Geschichte, bald diktieren, was dem Willen und der Not des Volkes nicht mehr entspricht". [4]

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3 ebda., S. 196-199

4 Radiointerview Ö 1, 1993, TB-Aufnahme

1989 fand in Basel die I. Europäische Ökumenische Versammlung statt. 700 Delegierte folgten der Einladung des Rates der Katholischen Kirchen (CCEE) und der Konferenz der Europäischen Kirchen (CEC) nach Basel und unterzeichneten das Dokument „Frieden in Gerechtigkeit“, welches eine neue Weltwirtschaftsordnung nach den Kriterien sozialer Gerechtigkeit und Umweltverträglichkeit im Blick auf künftige Generationen anspricht und sich im Wesentlichen auf die Trias des Konziliaren Prozesses beruft.

Diese Anliegen mündeten einerseits in die Weltversammlung für Gerechtigkeit, Frieden, Bewahrung der Schöpfung in Seoul 1990 und in die Vorarbeiten zur Welt-Umwelt-Konferenz in Rio de Janeiro 1992.

Es folgten weitere lokale und internationale Kirchenversammlungen, Konsultationen und Konferenzen, an welchen sich alle christlichen Kirchen beteiligten, allerdings jeweils mit unterschiedlichem Status.

An der Basis entstanden Arbeitsgruppen für Gerechtigkeit, Frieden, Bewahrung der Schöpfung (GFBS), welche heute nur noch wenig Bedeutung und Aktualität aufweisen.[5]

Unmittelbar nach der I. Europäischen Ökumenischen Versammlung wurde in den orthodoxen Kirchen der Schöpfungstag am 1. September eingeführt. Vom Ökumenischen Patriarchen erging die Empfehlung an die gesamte Christenheit, diesen Tag mitzubegehen.

Der Durchbruch – das European Christian Environmental Network (ECEN)

Erst im Rahmen der II. Europäischen Ökumenischen Versammlung von Graz 1997 gelang es entsprechende Handlungsempfehlungen zu verabschieden. Sowohl die Trias des Konziliaren Prozesses verbunden mit der Agenda 21 als auch der Schöpfungstag und die Empfehlung für die Gründung eines Netzwerkes der christlichen Kirchen fanden Aufnahme in die Schlussdokumente. Erstmals wird die Bewahrung der Schöpfung als zentrale Aufgabe im kirchlichen Alltag gesehen, als „neue Praxis ökologischer Verantwortung, jetzt und im Hinblick auf künftige Generationen“. Es fehlt auch nicht an Schuldeinsicht in diesen Dokumenten. Ein entsprechender Lebensstil ist zu finden, der von Konsumzwängen befreit, zu wirklicher Lebensqualität führt.

Im Vorfeld zu dieser Ökumenischen Versammlung fanden sich Vertreter von bewährten kirchlichen Initiativen zur Behandlung der Schwerpunkte des Konziliaren Prozesses ein und aktualisierten diesen auf neue Möglichkeiten und neue Kooperationen.

Diese Gruppe stieß zunächst auf Ablehnung seitens der Organisatoren, welche die Versammlung alleine unter dem Titel „Versöhnung, Gabe Gottes“ sehen wollten.

In einem weiter gefassten Verständnis von Versöhnung konnte jedoch die Schöpfungsverantwortung nicht fehlen, wie dies auch in Vorträgen und Hearings bei der europäischen Kirchenkonferenz deutlich zum Ausdruck kam. Eine Präsentation

[5] Eine Recherche Ende 1989 ließ nur noch glosende Herde erkennen.

bereits bestehender ökosozialer Initiativen unterstrich die Machbarkeit des Unternehmens.

Die Gründung des European Christian Environmental Networks (ECEN) fand 1989 statt.[6]

„Im Oktober 1998 kamen 60 Personen in der Orthodoxen Akademie in Vilemov in der Tschechischen Republik zusammen, um die Empfehlung zu untersuchen und die Empfehlungen umzusetzen.

Die Teilnehmer einigten sich auf die dringende Notwendigkeit einer verstärkten Zusammenarbeit und beschlossen einstimmig die Gründung eines Netzwerkes unter dem Titel "Europäisches Christliches Umweltnetzwerk".

Das Ziel des Netzwerkes ist die Arbeit für eine nachhaltige Entwicklung auf allen Ebenen - der Gemeinde, der Region, des Landes und Europas. Dazu gehören nicht nur die ökologischen, sondern auch die sozialen, geistlichen, politischen und wirtschaftlichen Dimensionen des Lebens.

Im Einzelnen:

- Förderung der Mitglieder bei der Entwicklung von praktischen Aktionen, um die Verantwortung der Kirchen in christlicher Überzeugung wahrzunehmen
- Unterstützung der Kirchen in ihrer theologischen Reflexion über das Geschenk der Schöpfung Gottes und spezifische Umweltfragen
- Einholen von Fachwissen
- Verstärken des ökologischen Bewusstseins und Engagements der europäischen Kirchen
- Analyse der sozialen und politischen Auswirkungen von Umweltfragen und Förderung von gemeinsamen Aktivitäten zu ihrer Behandlung
- Erkennen von Umweltproblemen, die auf europäischer Ebene entstehen, um den Kirchen Wege vorzuschlagen, damit umzugehen
- Förderung des Dialogs über Umweltfragen zwischen den europäischen Regionen (Ost und West, Nord und Süd)
- Förderung des Dialogs über Umweltfragen zwischen Europa und den anderen Regionen der Welt
- Anregung von fachbezogenen Formen der Zusammenarbeit mit Nichtregierungsorganisationen und den Europäischen Organisationen und Institutionen

Die Arbeit im Netzwerk geschieht in fachbezogenen Coalitionen, über welche eine Website informiert.[7]

Eine Leitungsgruppe, das Enablingteam, begleitet den Prozess der Netzwerkbildung, lädt neue Mitglieder ein, bereitet die jeweils nächste Vollversammlung vor, ermutigt und begleitet gemeinsame Aktivitäten, koordiniert

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6 Es folgen Auszüge aus der Gründungserklärung

7 www.ecen.org

die Coalitions. Dem Enablingteam obliegt auch die Haushaltsplanung. Die Wahl des Enablingteams wird von den jeweiligen Generalversammlungen vorgenommen."

Dem Enablingteam gehören Vertreter bewährter kirchlicher Umweltinitiativen an, sowie ein Vertreter des Rates der Europäischen Kirchen. Die katholische Dachorganisation hat sich in der Gründungsphase zurückgezogen, erst nach und nach kommen katholische Vertreter in das Netzwerk.

Mittlerweile gehören dem ECEN mehr als 100 Vertreter der christlichen Kirchen an, so auch die ARGE Schöpfungsverantwortung, welche auch im Vorfeld zur Grazer Versammlung tätig war und als deren Gründerin und Vertreterin ich heute hier bin.

Seit Bestehen des ECEN wurden 4 internationale Konferenzen mit ökologischen und schöpfungstheologischen Schwerpunktthemen abgehalten, drei davon auf Einladung orthodoxer Kirchen. Sie sollten möglichst alle Regionen Europas berühren, weshalb der Bogen der Konferenzen von Minsk, Weißrussland, bis Volos, Griechenland, reicht.

Aus den Coalitions sind Dossiers samt Hilfestellungen hervorgegangen. Derzeit sind folgende Coalitions aktiv, Klima und Energie, Ökologie und Ökonomie, Erziehung, Theologie, Agenda 21, Bioethik, Schöpfungstag/Zeit der Schöpfung. Letztere erstellte in den letzten Jahren stets ein Dossier zum jeweiligen UN-Jahresthema.

Vertreter des ECEN nehmen an internationalen Konferenzen teil, insbesondere an den Klimakonferenzen. Ihnen obliegt es aktiv in den Bewusstseinsprozess einzusteigen und die Arbeit sowie die Forderungen des ECEN einzubringen.

Maßgeblich beteiligt am Aufbau der vernetzten kirchlichen Umweltarbeit ist der Ökumeniker Professor Lukas Vischer, dessen jahrzehntelanges Engagement für die Bewahrung der Schöpfung Voraussetzungen dafür geschaffen hat. Aber auch ohne die Unterstützung des Rates der Europäischen Kirchen (KEK) wäre das Netzwerk nicht zum Leben gekommen.

So bleibt die Hoffnung, dass für ein ungemindertes kirchliches Engagement die katholischen Kirchen die Zusammenarbeit suchen und schließlich alle Kirchen gemeinsam ein Budget zur Verwirklichung ihrer Aussagen und Empfehlungen bereit stellen. Denn sonst bleibt alles Theorie, trotz der hervorragenden und umsichtigen Handlungsempfehlungen.

Nun noch ein Wort zur Organisation (Arbeitsgemeinschaft *Schöpfungs-verantwortung), als deren Vertreterin ich hier eingeladen bin:*

Unmittelbar nach der I. Europäischen Ökumenischen Versammlung von Basel hatte ich den Eindruck, dass der Prozess für GERECHTIGKEIT-FRIEDEN-BEWAHRUNG DER SCHÖPFUNG (GFBS) nicht recht in Bewegung kommt, weshalb ich den Entschluss fasste, selbst damit zu beginnen.

Diesem Engagement liegt ein Schlüsselerlebnis in jungen Jahren zugrunde, das mir die Notwendigkeit eines Bürgerengagements verdeutlichte. Ab diesem Zeitpunkt versuchte ich mein kirchliches Engagement mit dem ökologischen zu verbinden.

In der Kirche gab es kaum Ansprechpartner (die Verhinderung des österreichischen Atomkraftwerkes geht nicht auf deren Beteiligung zurück), zumindest nicht bis zum Reaktorunglück von Tschernobyl.

Die Erklärungen der I. Europäischen Ökumenischen Versammlung von Basel 1989 gaben mir die Rechtfertigung für den Einstieg in die kirchliche Umweltarbeit.

Nach mehr als hundert Motivationsbesuchen in kirchlichen Einrichtungen und bei den Verantwortungsträgern fand sich eine Gruppe Engagierter ein, die ARGE Schöpfungsverantwortung mit mir zu gründen.

Neben der flächendeckenden Bildungs- und Motivationsarbeit wurden ein Volksbegehren zur Gentechnik, außerdem Klima- und Energiekampagnen sowie Lebensstilprojekte durchgeführt.

Bereits in den ersten Jahren suchte ich Kontakt zu den Kirchen Europas, zu deren Umweltbeauftragten, bzw. Umweltaktivisten.

Die Mitbegründung des ECEN war naheliegend, aber auch andere Kooperationen mit Umwelt- und Entwicklungsorganisationen entstanden. Von 1966 bis 2000 war ich Beauftragte der Österreichischen Bischofskonferenz, in diese Zeit fiel auch mein Besuch beim Präfekten der Glaubenskongregation im Vatikan.

Mit großer Sorge sieht sich unsere Organisation dem Widerstand der Kirchenleitung in Österreich gegenüber. Denn die Zeit drängt! – Carl Friedrich v. Weizsäcker hat es vor 20 Jahren den Kirchen vorgehalten.

Für die Zukunft sehe ich nur eine Chance, nämlich dass weltweit in- oder außerhalb der Kirchen immer mehr Bewegungen des Dritten Sektors entstehen, diese schließlich ein tragfähiges Netz bilden und lebenszerstörende Unternehmungen aus den Angeln heben.

Ich hoffe darauf, dass das Prinzip der Schöpfung sich durchsetzt und Gott mit den Menschen ist, im Elend wie in der Fülle des Lebens, und dass eines Tages das „Reich Gottes“ Verwirklichung findet.

Für weiterführende Information siehe bitte „Handlungsempfehlungen der II. EÖV II“.

Emil Brix*

Zivilgesellschaft als Chance für die Demokratie

Summary

The main challenge of democracies is to remain or to become capable of constantly reforming themselves. Reducing political ethics to the rule of law is not sufficient to deal with individualization and globalization processes. Moralistic attitudes adopted in strategies for dealing with cultural differences and leading only to short-term success are not helpful. According to the philosopher Richard Burger they might lead to a "re-theolization of politics".

For some years, the Civil Soiety has been discussed worldwide as a potential factor for renewing democracies in East and West without giving up democracy´s achievements. In the search for a "fair political order", one of the major issues is whether our welfare-oriented states are still able to foster democratic virtues and the readiness to show solidarity. In the future, Governments and citiziens must learn to share tasks in new ways by encouraging solidarity, developing structures of participation and strengthening trust in new forms of political organization. A Humane Society should be based on social capital and good governance.

The division of labour and responsibility between citizens and the state must be re-negotiated in a democratic manner, so that new forms of solidarity can evolve. Civil societies can do this job: in families, associations, NGOs etc., thus complementing or replacing formal institutions. A new relation between private interests and public solidarity must be learned and given shape. This is what is known as the "Humane Society". As for responsibility, three different versions of the Humane Society are in discussion: (1) Highest possible responsibility of the individual; (2) The development of the Humane Society occurs mainly in a free space between state, market and individuals on the basis of voluntary associations. (3) The state continues to be the main decision-making entity, although it is continuously and increasingly withdrawing from social tasks.

The common search of the three mentioned versions of Humane Societies is the search for new forms of solidarity. Legitimacy problems arise. This issue has to be re-negotiated between associations, churches, unions and other groups of society in a democratic way. With their emphasis on freedom, a sense of community and fairness, Civil Societies challenge the democratic state.

* Emil Brix, Dr., Botschafter, Vienna, Austria, e-mail: emil.brix@bmaa.gv.at

The political change in 1989 offered an opportunity for countries of Central (Eastern) Europe to adopt the Western model, but it was also an opportunity for Europe as a whole to bring about a fundamental change in the relations between governments and civil societies. Nations and ideologies had failed in 1945 and 1989. Therefore, a dialogue with Civil Societies about issues such as funding of industry, refugee policies, locational policies etc. has become absolutely necessary.

The welfare states of Western Europe believed they were economically superior and had the best possible structures to solve any political issues whatsoever. But symptoms of crisis brought communitarians and supporters of social capital to the fore. Civil Societies require transnational forms of participation in order to become global players of the sort that surrender neither to the free market economy nor to state interests. This includes a critical approach to ideologies and governments as well as an awareness of structural changes in the public sphere (the demand for individual freedom and the consideration of new social movements).

The principle of subsidiarity is on people´s minds. Problems should be solved where the people live who have the problems. This collides, however, with globalization trends, and people feel frustrated accordingly, not believing there is much they can do to manage their own affairs. Modern life and democracy seem to be drifting apart, with states worried about their own survival vis-à-vis terrorism and what they perceive as a clash of cultures. Citizens´rights are being curtailed. There is less and less room for civil action. Precisely for this reason, a discussion with Civil Societies about principles and instruments of a modern democracy is an urgent matter of concern.

Die zentrale politische Herausforderung moderner Demokratien besteht in der Erhaltung und Erneuerung ihrer Reformfähigkeit angesichts externer und interner Krisensymptome. Moderne demokratische Systeme sind daran gewöhnt, Fragen der politischen Ethik auf das Funktionieren des Rechtsstaates und seiner demokratischen Institutionen zu reduzieren. Aber Individualisierungs- und Globalisierungsprozesse bewirken, dass demokratische Staaten nicht mehr umfassend die Bedingungen ihrer Sachrationalität garantieren können. Sie wenden sich daher zunehmend den kurzfristig Erfolg versprechenden Strategien kultureller Differenzierung (identitätspolitische Diskurse) zu. Deutlich wird dies an der Zunahme von Auseinandersetzungen um Geschichtspolitik, an den Integrationsproblemen im Umgang mit Migranten unterschiedlicher religiöser und kultureller Herkunft und generell an einer wieder entdeckten moralischen Mobilisierbarkeit durch Politik. Der Wiener Philosoph Rudolf Burger spricht von der Gefahr einer „Re-Theologisierung der Politik“. Dies stellt aber prinzipiell Grundfragen demokratischer Macht und Legitimität in Frage. Ein sachrationales

Erneuerungspotential ohne Aufgabe demokratischer Errungenschaften wird mit dem Begriff der Zivilgesellschaft ins Spiel gebracht.

Seit einigen Jahren wird weltweit die Überzeugung diskutiert, dass die Zivilgesellschaft zu einem entscheidenden Faktor der gesellschaftlichen Erneuerung werden kann. Dabei verbinden sich Diskussionen im ehemaligen „Osten", wo seit 1989 aufgrund der Erfahrungen des Kommunismus die Suche nach einer „gerechten" politischen Ordnung Teil des Wandlungsprozesses ist, mit westeuropäischen und amerikanischen Diskussionen um die Frage, ob die an staatlichen Institutionen orientierten Wohlfahrtsstaaten unserer Prägung noch republikanische und demokratische Tugenden stärken können und ob die Bereitschaft zur Solidarität, in Form staatlicher Umverteilung zur Finanzierung des Sozialstaats, noch gegeben und sinnvoll ist.

In der Zukunft sind die scheinbar klaren Aufgabenverteilungen zwischen dem Staat und seinen Bürgern neu zu diskutieren. Die Balance zwischen Staat und Bürger braucht eine neue überzeugende Begründung, weil wir tendenziell alle zu NGO's werden. Die Anforderungen bestehen in einer neuen Aktivierung von „Solidarität", der Formulierung partizipativer Strukturen und der Stärkung von „Vertrauen" in politischen Organisationsformen. Begriffe wie „Sozialkapital" und „good governance" haben Konjunktur, weil sie versuchen, an der Schnittstelle zwischen dem Öffentlichen und dem Privaten analytisch und normativ den Begriff der humanen Gesellschaft als Aufgabe genauer als bisher zu formulieren.

Die drei derzeit erkennbaren sehr unterschiedlichen Szenarien einer humanen Gesellschaft der Zukunft unterscheiden sich in ihrer Beurteilung von Rolle und Struktur der Zivilgesellschaft und damit in der Frage, wo die **Verantwortung für soziale Aufgaben** primär angesiedelt werden soll:

- Eine humane Gesellschaft beruht auf der größtmöglichen Eigenverantwortung des Einzelnen, der immer weniger verpflichtende dauerhafte Bindungen eingeht, aber hochmotiviert ist für „freiwillige Solidarität". Themenbezogene, kurzfristig agierende „soziale Bewegungen" unterstützen solidarische Anlegen. Dieses Modell setzt eine ökonomisch und sozial weitgehend homogene Gesellschaft ohne große kulturelle Bindungssehnsucht voraus. Der Staat und NGO's konzentrieren sich darauf, für soziale Aufgaben zu motivieren.
- Eine humane Gesellschaft konstituiert sich in dem möglichst freiwillig organisierten und möglichst öffentlichen Raum zwischen Staat, Markt und Einzelperson. Getragen wird sie weitgehend von freiwilligen Assoziationen im weitesten Sinn (Familie, NGO's, Kirchen, Gewerkschaften, Parteien), die aber innerhalb ihrer Gruppe sehr viel an „verpflichtender Solidarität" herstellen. Durch größtmögliche

Öffentlichkeit dieses Raumes ist wenig an zusätzlicher staatlicher Lenkung erforderlich.

- Eine humane Gesellschaft wird von Einzelpersonen und freiwilligen Assoziationen formuliert und getragen, die dafür auch Öffentlichkeit herstellen, aber die zentrale Entscheidungsebene bleibt der Staat, der die Formen seiner demokratischen Legitimierung ständig überprüft. Auch in diesem Modell zieht sich der Staat immer stärker aus der Umsetzung der zu leistenden sozialen Aufgaben zurück.

Diesen unterschiedlichen Konzepten einer zivilen Gesellschaft liegt die gemeinsame Vorstellung zugrunde, dass die Diskussionen um das Verhältnis zwischen Staat und Gesellschaft, allgemeiner gesagt, zwischen der politischen Ordnung und jenen, die dieser Ordnung unterliegen, angesichts von Prozessen der Globalisierung und Individualisierung neu zu führen sind. Gemeinsam ist diesen Konzepten auch ein Bekenntnis zum freiheitlich-demokratischen System, in dem der Bürger neben der staatlichen auch andere wesentliche Bindungsoptionen eingeht. Dahinter steht die Erkenntnis, dass eine rigide Arbeitsteilung zwischen dem Einzelnen, der für sein privates Glück zuständig ist, und dem Staat, der für das „Gemeinwohl" verantwortlich ist, keine dauerhafte Konstruktion darstellt. Gemeinwohl kann durch die Förderung von gemeinschaftlichem Handeln in privaten Institutionen, die Identität in horizontaler und nicht in vertikal hierarchischer Form vermitteln, gestärkt werden.

Die Probleme im Verhältnis Bürger und Staat zeigen sich heute beispielhaft im Reformbedarf ostmitteleuropäischer und südosteuropäischer Demokratien, in der Krise des westeuropäischen Sozialstaates und des US-amerikanischen liberalen Wohlfahrtsstaates, in den Souveränitätsverlusten des Nationalstaates, in Vorstellungen einer „Dominanz des Ökonomischen", in wachsenden Migrationsströmen, Zieldiskussionen der Entwicklungspolitik und in den Vertrauenskrisen der Europäischen Union. **Die notwendigen neuen Formen der „Solidarität" müssen wieder demokratisch ausverhandelt werden.** Die Civil Society als der „Raum" von Freundeskreisen, Vereinen, Kirchen, informellen Treffpunkten, Wirtschaftsvereinigungen, Gewerkschaften und anderen vom Staat unabhängigen und freiwilligen Assoziationen ist der Ort, wo dies verhandelt werden soll. Sie bedeutet eine Vermittlungsebene zwischen dem Einzelnen und dem Staat, indem sie eine Arena herstellt, in der die Bürger die Gepflogenheiten freier Vereinigung, offenen Dialogs und sozioökonomischer Initiative lernen können, die für das demokratische Leben Erneuerungsimpulse enthält und auf neue gesellschaftliche Anforderungen rascher und problembezogener reagieren kann als formale Institutionen. Civil Society gilt dabei als ein Ort des Erlernens und der Gestaltung des in jeder Gesellschaft entscheidenden Verhältnisses zwischen privaten Interessen und öffentlicher Solidarität.

Aktuelle grundsätzliche Diskussionen um die Strukturen gesellschaftlicher Ordnung hängen eng mit den Legitimitätsproblemen der modernen demokratischen Staaten zusammen, die in den zentralen Fragen von Freiheit, Gemeinschaft und Gerechtigkeit vom Begriff der Zivilgesellschaft herausgefordert werden. Den unterschiedlichen Konzepten einer zivilen Gesellschaft liegt die Vorstellung zugrunde, dass die Diskussionen um das Verhältnis zwischen Staat und Gesellschaft, allgemeiner gesagt, zwischen der politischen Ordnung und jenen, die dieser Ordnung unterliegen, angesichts von Prozessen der Globalisierung und Individualisierung neu zu führen sind. Gemeinsam ist diesen Konzepten ein Bekenntnis zum freiheitlich-demokratischen System, in dem der Bürger neben der staatlichen auch andere wesentliche Bindungsoptionen eingeht[1]. Dahinter steht die Erkenntnis, dass eine rigide Arbeitsteilung zwischen dem Einzelnen, der für sein privates Glück zuständig ist, und dem Staat, der für das „Gemeinwohl" verantwortlich ist, keine dauerhafte Konstruktion darstellt. Gemeinwohl kann durch die Förderung von gemeinschaftlichem Handeln in privaten Institutionen, die Identität in horizontaler und nicht in vertikal hierarchischer Form vermitteln, gestärkt werden.

Der Begriff „Civil Society" dominiert seit Jahren die wissenschaftliche und öffentliche Diskussion über die sozialen Voraussetzungen pluraler Demokratie. Er vereint sehr unterschiedliche Formen gesellschaftlichen Krisenbewusstseins, die im Reformbedarf ostmitteleuropäischer Demokratien, in der Krise des westeuropäischen Sozialstaates und des US-amerikanischen liberalen Wohlfahrtsstaates, in den Souveränitätsverlusten des Nationalstaates, in Vorstellungen einer „Dominanz des Ökonomischen", in wachsenden Migrationsströmen, Zieldiskussionen der Entwicklungspolitik und in den Integrationsproblemen der Europäischen Union zum Ausdruck kommen[2]. Obwohl die verwendeten Begriffsbestimmungen nicht in allen Einzelheiten übereinstimmen, beschreiben die meisten die Civil Society als den „Raum" von Freundeskreisen, Vereinen, Kirchen, informellen Treffpunkten, Wirtschafts-vereinigungen, Gewerkschaften und anderen vom Staat unabhängigen und freiwilligen Assoziationen[3]. Dargestellt wird sie als Vermittlungsebene zwischen dem Einzelnen und dem Staat, indem sie eine Arena herstellt, in der die Bürger die Gepflogenheiten freier Vereinigung, offenen Dialogs und sozioökonomischer Initiative lernen können, die für das demokratische Leben Erneuerungsimpulse enthält und auf neue gesellschaftliche Anforderungen rascher und

[1] Emil Brix, Das Ende des Staates. In: Reginald Földy/Clemens Heidack (Hgg.), Die Kultur der Verweigerung. Das konstruktive Nein (Wien/Köln/Weimar 2000) 131-139.

[2] Siehe: Ernest Gelber, Conditions of Liberty: Civil Society and its Rivals (London 1994).

[3] Als Einführung in die Begriffsdiskussionen siehe: Bert van den Brink/Willem van Reijen (Hgg.), Bürgergesellschaft, Recht und Demokratie (Frankfurt a. M. 1995).

problembezogener reagieren kann als formale Institutionen. Civil Society gilt dabei als ein Ort des Erlernens und der Gestaltung des in jeder Gesellschaft entscheidenden Verhältnisses zwischen privaten Interessen und öffentlicher Solidarität.

Mit dem Fall des Eisernen Vorhanges im Jahr 1989 ist nicht nur die Teilung Europas überwunden worden und dem Osten eine Chance auf die Übernahme des westlichen Modells von Demokratie, Rechtstaatlichkeit und Marktwirtschaft eröffnet worden. 1989 ist für Europa auch Konsequenz und Symbol für einen grundsätzlichen Wandel im Verhältnis von Staat und Zivilgesellschaft, der beide ehemals getrennten Teile des Kontinents betrifft. Das auf Modernisierung durch staatliches Handeln konzentrierte 20. Jahrhundert beruhte darauf, dass aus den Vorgaben der Aufklärung und dem prinzipiell totalen Anspruch der Nation politische Ordnungen entstehen, die dem Bürger die beste Form von Freiheit und Ordnung anbieten und ihm daher ohne weiteres genügen sollen. Die totalitären Ansprüche der Konzepte "Nation" und "Weltanschauung" sind in Europa 1945 und 1989 gescheitert. Totalitäre Staatsansprüche scheitern nicht so spektakulär, weil sie Sachrationalität und nicht Moral in den Vordergrund stellen. Aber je weniger staatliches Handeln in den europäischen Staaten Kompetenz und Sachrationalität anbieten kann, desto mehr moralische Argumente werden vorgebracht, um die Macht und Legitimität staatlichen Handelns sicher zu stellen. Staatliche Standortpolitik und Wirtschaftsförderung, Kopftuchstreit, Asyl- und Fremdenpolitik sind Beispiele für jene politischen Fragen, in denen Staaten ihre Entscheidungen nicht mehr primär sachrational begründen können, ohne neue Dialogformen mit der Zivilgesellschaft zu entwickeln.

Die westeuropäischen Wohlfahrtsdemokratien haben noch vor wenigen Jahren den Eindruck vermittelt, dass sie für alle großen politischen Fragen die bestmöglichen Strukturen haben, um sie zu lösen oder zumindest um sie in demokratischen Institutionen zu diskutieren und Aussicht auf Lösungen zu versprechen. Das westliche Modell rechtsstaatlicher Demokratien konnte sich auf seine wirtschaftliche Überlegenheit berufen und nach dem Zusammenbruch des europäischen Kommunismus sogar das Ende der Geschichte ausrufen. Erste Krisensymptome haben dann vor allem amerikanische Politexperten auf den Plan gerufen, die entweder die Kraft bürgerlicher Gemeinschaften reaktivieren wollen (Kommunitaristen) oder zumindest einen neuen Bewertungsmaßstab für erfolgreiche Gesellschaften (Sozialkapital) einfordern. In dieses selbstgefällige Bild Europas haben sich gleichzeitig kritische Stimmen bezüglich der Konsequenzen von Globalisierungsprozessen in Richtung geringerer Partizipationschancen einzelner und in Marktprozessen benachteiligter Gruppen gemischt. Das Stichwort "Imperium" wird politisch und wirtschaftlich neu diskutiert. Dabei vermischt sich in Europa Kritik an den Vereinigten Staaten mit der ambivalent zu beurteilenden

Vorstellung, dass Europa vom "global payer" zum "global player" werden soll. Um gleichzeitig innerhalb der Europäischen Union die Kontroll- und Partizipationsmöglichkeiten der Bürger zu stärken, werden transnationale Beteiligungsformen der Zivilgesellschaft überlegt.

Für soziale Sinn- und Ordnungszusammenhänge, die sich weder primär an Markt- noch an Staatsinteressen orientieren, wurde ganz generell der Begriff der Zivilgesellschaft zu einem politischen Schlagwort, in dem sich drei Perspektiven gesellschaftlicher Kritik vereinen:

- Ideologiekritik (Kommunismus, Kapitalismus, Globalisierung)
- Kritik am Staat als dominante Ordnungseinheit, dessen Steuerungsfähigkeit zurückgeht
- Forderung nach individuellen Freiheitspotentialen und politischer Berücksichtigung neuer sozialer Bewegungen (Strukturwandel der Öffentlichkeit).

Liberale Theoretiker wie John Rawls und Charles Taylor sehen in dieser Kritik ein Problem, das sich im Wesentlichen durch differenziertes Sprechen lösen lässt. Vermieden werden müsse die "Vermengung von partikularen politischen Prinzipien, auf die ein Staat gegründet ist, mit der tieferen ethischen Auffassung des menschlichen Lebens, mit welcher diese Prinzipien gerechtfertigt werden"[4]. Tatsächlich bieten die modernen institutionen- und parteienorientierten Demokratien immer weniger umfassende Identifikationsmöglichkeiten. Zwischen den Regierenden und den Regierten ist die Selbstverständlichkeit der Rollenverteilung von einem Teil der Lösung von Problemen zu einem Teil des Problems geworden. Zivilgesellschaft wird zum Ausdruck für eine stärkere Differenzierung von Interessen und Gemeinschaftsbildungen innerhalb von Staaten und auf europäischer Ebene.

Diese neue Diskussion um eine rationale politische Ordnung berührt alle Lebensbereiche. An den Zielsetzungen, einen Ausgleich zwischen Freiheit, Gleichheit und Brüderlichkeit zu finden, hat sich nichts geändert. Aber wer soll entscheiden, auf welcher Ebene öffentliche Angelegenheiten geregelt werden und wie viel geregelt werden soll? Die Diskussion um eine an Raum und Ort orientierte Politik stärkt das Interesse an Subsidiarität. Probleme sollen dort gelöst werden, wo die Betroffenen leben. Dies ist effizient, problemadäquat und sichert die Zustimmung der Menschen. Aber die Königsfrage lautet: wer ist betroffen? Wenn Globalisierung etwas bedeutet, dann soviel, dass sich immer mehr Menschen von immer mehr Entscheidungen unmittelbar betroffen fühlen. Daraus entsteht die Angst vor der Globalisierung, in der das Dilemma zwischen globaler werdenden

[4] Charles Taylor, Religion, Identität und europäische Integration. In: Transit. Europäische Revue 26 (Frankfurt am Main 2003) 181.

Problemen und einer Sehnsucht nach dem Lokalen sichtbar wird. Es gibt eine steigende Bereitschaft, sich in die eigenen Angelegenheiten einzumischen und ein wachsendes Gefühl der Ohnmacht bezüglich der realen Chancen dies zu tun.

Modernität und Demokratie scheinen auseinander zu laufen, weil Demokratien zu wenige zivile Handlungsräume zulassen. Sie mögen dies aus Sorge davor tun, dass die Demokratie nicht mehr die Bedingungen ihres eigenen Bestandes garantieren kann (z.B. Einschränkungen von Freiheitsrechten zur Bekämpfung von Terrorismus) oder auch als Folge eines erwarteten „Kampfes der Kulturen“. In beiden Fällen bedeutet dies aber, dass Prinzipien und Instrumente einer modernen Demokratie nicht weniger sondern mehr mit der Zivilgesellschaft diskutiert werden müssen.

Michał Siciński*

Ecology and Sustainable Development within a General Social Theory: Old and New Approaches

As they are commonly defined, the concepts of ecology and sustainable development are very general and can be applied to many different problems in the areas of science, technology, philosophy, and even politics. However, they are largely based on the conditions of modern industrial or post-industrial society, which are not defined precisely enough in economic, demographic and socio-political terms. They also do not really differentiate between historical situations, with which they are concerned in practical terms, and the different theoretical contexts in which they appear. Applying these ideas to the wide context of socioeconomic and political development throughout many centuries and taking into account the factor of so-called social consciousness, gives the starting point for developing a general philosophy of history. The ideas of Karl Marx and his numerous followers form the basis of this philosophy which is commonly known as historical materialism (see: K. Marx - Das Kapital; K. Marx - Die Einführung in die Kritik der Politischen Ökonomie. Das Vorwort; F.Engels – Der Ursprung der Familie, des Privateigentums und des Staats; K. Kautsky – Die Materialistische Geschichtsauffassung). We shall treat historical materialism as a guideline here, without feeling obliged to follow the political or practical conclusions derived from the philosophy of Marx either by the author himself or by any of his followers.

In a general framework of historical materialism, society is considered to be a multilevel structure comprising several relatively separate but mutually dependent main spheres, including the following four:

1. The technosphere, comprising the technological abilities and technical means available to society.
2. The organisational structure of its economy, determined mainly by the system of ownership.
3. The political and legal organisation of society determined by the organisational structure of the economy.
4. "Social consciousness" i.e. society's dominant ethos and dominant forms of cultural production, particularly those which influence technology and organisational, political and legal structures, either to strengthen or weaken them.

In general terms, the socioeconomic basis of society consists of the first two spheres and the superstructure of society of the two remaining spheres. The technosphere acts as the driving force behind the development of social reality as a whole consisting of all the spheres. It is in the technosphere that long term and so-called "continuous progress" takes place. This is permanent technological

* Michał Siciński, Faculty of Applied Social Sciences, Department of Philosophy, University of Science and Technology, Krakow, Poland

development, which is considered to be the main independent variable of the dynamic process of social evolution. The technosphere is considered to be "primary" in respect to the socio-economic structure, which is itself "primary" with regard to the political and legal sphere; it also has a decisive influence on the sphere of social consciousness and receives services from it.

The advantages and disadvantages of this approach to historiosophy will not be considered here. Furthermore, we will not attempt to develop precise elaborations of the concepts of historical materialism, though there is a clear need for this. We will only note that the problems of ecology or/and sustainable development were absent from historiosophical discourse in the nineteenth century. Therefore, in the context of nineteenth century historiosophical discourse in general or historical materialism in particular, it is not meaningful to consider whether the "continuous progress" of technology could be halted by ecological issues, such as scarce natural resources, or indeed by limited human abilities. In nineteenth century historiosophical discourse it was tacitly assumed that natural resources, technological capacities and human abilities all have no limits. It was also assumed that long term "continuous technological progress" and the social needs of humanity are mutually compatible. In the long term, "continuous progress" and the need for social stability and welfare were assumed to be mutually compatible. Any incompatibilities are localised in space and time (for instance the incompatibility between the demand for free labour for industry in the Kingdom of Poland before 1864, and its semi-feudal socioeconomic structure, which caused shortages of free labour). Revolutionary or evolutionary transformations will take place and resolve these temporary or localised incompatibilities.

However, we must stress that historical materialism, as a general historiosophy, is not based on the same type of empirical data over the full range of different historical conditions. Thus, it should not be applied in the same way to all historical conditions. The components of this historiosophy which describe pre-capitalist socio-economic systems (see F. Engels – Der Ursprung der Familie, des Privateigentums und des Staats) or hypothetical post-capitalist systems are based on rather vague hypotheses (the empirical evidence for which is rather limited), concerning the dominant forces of socio-economic progress, for instance the dominant role of the evolution of the family in primitive tribal societies. It was developed without consideration of all the relevant factors, in particular the efficiency of the structure of the economy. Only the description of capitalist systems was based on serious theoretical work on the capitalist economy (four volumes of Das Kapital), and aimed to investigate the dependencies between the economic, political and cultural parameters of the dynamics of social development. The starting point of Marx’s theory of capitalism was the primitive free-market capitalism of the first half of the nineteenth century. According to Marx's original theory, the social dynamics of this period were the key to understanding social development throughout history as a whole, at least at the most elementary level of analysis.

Primitive capitalist society in the eighteenth and the first half of the nineteenth century was, in principle, the society of elementary needs: its dominant economic

activities were aimed at meeting the "obvious" individual and social needs determined by biology, tradition and the direct demands of social stability and the means of enforcing the policy of the ruling classes (including the army, the police, the political structure and its associated costs). The dominant directions of economic activity were determined by these "objective" needs and were not directly influenced by autonomous activities in the superstructure, such as advertising or deliberate changes in the dominant culture. (The needs associated with the servicing of the existing superstructure, such as the construction of churches or royal palaces, are treated here as "objective" needs). In fact, the existence of these determinants of economic activity, common to pre-capitalist societies and early capitalism, justifies, at least to some extent, the placing of the presumed basis of Marxist classical theory of (early) capitalism in pre-capitalist socio-economic systems.

However, this is not the only factor that justifies a uniform approach to pre-capitalist and early capitalist societies. Equally important are the general historiosophical guidelines, which consider society to be only an exploiter of nature, able or even obliged to use it without any limitations ("fill the Earth and subdue it, and hold it in subjection...", Genesis, 1, 28). This approach can easily lead to the abuse of nature. On the other hand, according to pre-modern theories, nature was a stable system and the effect of human activities on it was trivial. Occasionally, local catastrophes were mentioned, for instance the damage done to the irrigation system in India by the British (see: K. Marx – Die Britische Herrschaft in Indien), but they were not considered to have any influence on a global scale.

Furthermore, the social substance was considered to be almost perfectly **plastic**, with no limits preventing it from adapting to the new conditions created by the dynamics of macro-social processes. This allowed to express the problem of the general trend of macrosocial development very simply: as the determination of the most efficient (on the spatial and temporal macroscale) path for humanising nature, i.e. allowing it to be exploited to meet human needs. As has been indicated above, these needs were "natural", mainly determined by human biology and changed within the logic of the "natural" way of life and its maintenance (initially obtaining sufficient food for subsistence, later additional food etc.). While the evolution of society remained stable, the tradition inherited from previous stages of evolution supported the needs arising from this "natural" way of life, as well as the forms in which they were satisfied by society. Therefore, for every time period t, human needs at that time can be understood as a function of the "natural" situation in the time t+? and the tradition inherited from the time t, where ? is an infinitesimally small time. Thus history seems to resolve a simple differential equation, describing the macrosocial process, which maximises the effectiveness of using (or abusing) natural resources in order to satisfy easily definable (although not constant) needs. The changing dynamics of this process are determined by a competition between the requirements of the dominant technologies, on the one hand, and the interactions of socio-economic factors on the other. This leads to competition between basis and superstructure (as well as between different factors within both of them). The natural environment is considered to be a bottomless source of everything humanity needs, such as land and minerals.

In simple terms, history continuously resolves the problem of maximising the efficiency with which the natural environment is exploited on the assumption that there are no limits to natural resources or to human labour available. At the macrosocial level the efficiency of this exploitation is determined by the efficiency of technology and **optimum** social conditions for its implementation. Therefore, the directions of social evolution are determined by maximising the effectiveness with which social structures are adapted to technology (if the technology is given), and by maximising the effectiveness of adapting social consciousness to social structures (if the structures are given). The historical role of different forms of class struggle is ambiguous: they can support the actual socioeconomic structure in the short term and oppose it in the long term, or the opposite. For example, the struggle of European workers for higher wages enabled the stable growth of capitalist markets at the turn of the nineteenth to the twentieth century, but reduced European competitiveness and economic growth at the turn of the twentieth to the twenty first century. The revolutionary movements in Russia at the beginning of the twentieth century crushed the remnants of feudalism and opened the door for capitalism, but soon made way for Stalinist state socialism, which was economically very ineffective in the long term. Using pseudomathematical language, this leads to the conclusion that under given initial and boundary conditions (determined by the technological and social situation at the initial time) the "movement equation" of human history does not have a unique solution. Consequently the so-called technological determinism often associated with Marxist historiosophy is not valid. Only an extremely simplified model of history can be strictly deterministic, but the one presented by Marx, even in the most idealised drafts of his historiosophy (see: K. Marx – Die Einführung in die Kritik der Politischen Ökonomie... Vorwort), is not. However, this complex problem will not be discussed further here.

The simplified historiosophical scheme approximately fits in with the simple conditions under which socioeconomic development was taking place. In principle, these simple conditions were determined solely by the "natural" basic human needs apparent in traditional forms and by the requirement for stability of the present social system based on a clear class hierarchy without any kind of class compromise or mediation. In such a socioeconomic system the conditions for the unlimited availability and exploitability of labour (openly assumed by Marx in the first volume of Das Kapital) and the unlimited adaptability of the labour force to changing technological and organisational requirements can be satisfied. (The latter condition is tacitly assumed in Das Kapital, as is necessary for the unlimited availability of labour). For the sake of completeness, the condition of unlimited exploitation of the natural environment is also required (e.g. no limits on environmental pollution by industry). This additional assumption is necessary to make this simplified macroscale model of socioeconomic development applicable to pre-capitalist and early capitalist societies. This model seems to be realistic in its application to the conditions of both primitive, extensively exploitative forms of economy and the primitive social orders based on pure or "crude" class rule and class exploitation, starting from the earliest societies based on slavery and ending with early capitalist society. To the extent that this theory is valid, it defines both a society without concern for the environment or

ecological consciousness and a particular kind of unsustainable development. This unsustainable development refuses compromises between the needs of different groups of people as well as between the needs of humanity and nature. It is based on a tendency to exploit human and natural resources until nothing remains. This type of development can only be stable if the resources really are inexhaustible, at least in comparison to the ability of the exploiting organisation to consume them, for instance in terms of conquering new lands and new slaves or breeding new domestic animals and new proletarians sufficiently fast. Stability also requires that there are no other more competitive socioeconomic organisations which are able to carry out more effective exploitation. Effectiveness of exploitation can be increased by new technologies or new organisational, legal, or ideological forms, all of which can, in principle, act as tools of unconditional exploitation. Thus, if the simplified version of historical materialism gives a reasonable approximation of the development dynamics of antique slavery, Asian, feudal and early capitalist societies, it also shows that sustainable development was (at the macroscale) impossible in those types of society. Consequently, the problem of sustainable development is a historiosophical question, inseparable from the question of the general determinants of history. In addition, historical materialism gives some theoretical tools for the formulation of this question. Then, historiosophy is also a philosophy of the relationship between humanity and the natural environment and of sustainable development. In the author's opinion, Karl Marx was not in a position, in 1840-60, to realise that long-scale developmental mechanisms (inside exploitative societies) cannot be based on the unconditional exploitation of the environment or of the labour force. Friedrich Engels, who did not have such a deep Hegelian feeling for history, but died 12 years later than Marx, started to learn in the 1890s that in a more developed capitalist society, in which trade unions and the socialist movement achieved a far reaching economic and political class compromise, the initial condition of class exploitation being unconditional, is not fulfilled anymore. However, the time for realising the historical necessity of a different type of relationship between humanity and the environment did not arrive until the second half of the twentieth century.

The origin of developed industrial society, in which human needs are much greater than the basic biological minimum, can be considered to be in the economic situation of a highly productive capitalist economy demanding to maximise the sale of goods and surplus value. This led to the class compromise resulting mainly from social-democratic policy. The founding of the twentieth century welfare state became necessary in industrial countries when the external markets for goods and raw materials (colonial, semi-colonial, Russian etc.) started to become insufficient. If the capitalist system had been economically isolated, that kind of class compromise would have been necessary much earlier. A similar process, leading to colonial and early feudalism, would have been inevitable in the classical (e.g. late Roman) slavery system with the drying up of external sources of cheap slave labour.

One should remember that, although K. Marx and F. Engels tried to construct an idealised theory of history with socio-economic processes modelled as "pure forms" of empirically given social reality, they did not want to move too far away from the recorded historical facts. As a result of methodological compromises, the level of

idealization by these authors varies in their different works and, in the modern perspective, generally seems too low. The need for more radical idealization seems obvious today, at least with regard to most general questions. The construction of a most idealized and more fundamental materialist theory of socioeconomic development should allow the consideration of factors which were absent from the original formulation of historical materialism. One of the most significant absences was the lack of consideration given to limitations resulting from limited natural and human resourc In both cases there is lack of consideration of restrictions in both quantity and type. This would allow both the environment and individual(s) to be transformed and exploited extensively and intensively without encountering any "objective" technological or sociocultural (rather than natural, e.g. physical or biological) barriers.

The society described by the most idealized scheme described above would allow totally 'free' development (with a minimum of external ties), closely in accordance with the model of purely technological "continuous progress" and independently of any given local and temporal conditions, whether environmental or social. In simple terms, in this type of society technology can be applied effectively anywhere and everywhere and there are no limits on either the extent or the ways in which the natural environment, social structures, cultural forms (the basis and the superstructure) and individual human physical and mental capabilities can be adapted to technologically determined needs. In such a model, the only causes of developmental discontinuities (revolutions) are technological revolutions. Although these revolutions also have social, cultural and psychological consequences, social structures passively adapt to technological requirements and the natural environment is limitlessly adapted to them. The model leads to an extremely unsustainable form of development or social evolution, although it satisfies the condition for continuous development.

The rules of social evolution described by a less idealized scheme which takes into account local, accidental or periodical shortages of some resources (natural or human, quantitative or qualitative) are not so simple. When the developing technology encounters a barrier or shortage, e.g. the lack of sufficient natural resources, qualified labour or a favourable dominant ideology, a tension exists between interrupting technological progress, enforcing social and cultural changes, and developing an alternative technology. An analysis of the first two situations is the classic or traditional versions of historical materialism (see: K. Marx – Einfuehrung in die Kritik der politischen Oekonomie. Das Vorwort): scarcities of properly qualified labour are considered to be a revolutionary factor causing radical changes of basis and superstructure. In fact, the dependence of the general direction of technological development on accidental natural shortages would seem to run counter to the general "technological determinism" assumed even in less idealized (more "realistic") versions of the theory. Furthermore, the empirical historical data available in the nineteenth and even in the first half of the twentieth century did not suggest that the factor of technological and social evolution could be significant on a global and historical scale. In fact, the significance of this factor is only just starting to be recognised. However, if the analysis begins in the second half of the twentieth

century, empirical data can be obtained to justify the historiosophical hypothesis that environmental and social factors on a global scale, such as the shortage of natural resources, global climate change, pollution, over- or under-population and the shortage of people with appropriate skills, are fundamental determinants of socio-economic evolution and have the same degree of importance as technological developments. Population growth or reduction in modern societies obviously depends on cultural factors. The shortage of people with natural abilities in some areas, which has, for instance, resulted in insufficient numbers of qualified computer scientists being trained in some countries, is also a result of cultural factors and population dynamics. There are also complex interdependencies in the system consisting of the following five spheres:

- The natural environment, which is a complex dynamic system that determines the dynamic prerequisites for development, rather than a static bottomless reservoir.
- Technology, which needs to take account of the natural environment and is not omnipotent or limitlessly flexible.
- The organisational structure of the economy, which should be adapted to the needs of both the environment and technology.
- The structures of the political and legal systems.
- Social consciousness with regard to the ecological, technological, political and legal situation of humanity.

In simple terms, a more complete version of historical materialism should include the impacts of the natural environment on human history. It should be noted that this aspect of theory is not particularly new and that some of the well-known works of Engels cited above on the origins of the family contain elements of this theory. However, Engels did not consider the dependency of humanity on the natural environment in general: he was only interested in researching the evolution of the primitive family and society in relation to the biological conditions on which breeding is based and which have little to do with sustainable development. The concept of sustainable development can and should be considered as a fundamental component of a generalized framework for a materialist understanding of history. In this case, sustainable development will be understood as a development which maintains a changing, but stable inter-dependency between society and changing environmental conditions. At the same time, sustainable development also maintains a stable technological, socioeconomic, sociopolitical and cultural evolution, as well as the ability in both biological and psychological terms of individual people to adapt to all the resulting changes.

To clarify what is meant here, a few remarks will be required. Firstly, evolutionary and predictable changes in the natural environment, rather than sudden catastrophic events, will be considered here. Secondly, a changing, but stable inter-dependency between society and changing environmental conditions does not necessary imply the preservation of resources, as this would be unrealistic, but a moderate rate of exploitation which allows an easy transition to other forms of

economic activity, for instance based on other sources of energy, when required, for increased effectiveness. Thirdly, analogously to "progressive" forms of socioeconomic, legal and political organization, technological development is only expected to ensure stable development at the spatial and temporal macroscale, but not necessarily at any given time in any given place, as this would be unrealistic. There is a need for technological revolutions which lead to developmental discontinuities and tensions between the environmental and technical spheres, as well as between the technosphere and socioeconomic structures. However, in the long term and on the global scale, technological revolutions will have a tendency to result in the coherent and smooth evolution of all the spheres. Fourthly, the appropriate utilisation of natural resources and the equitable management of human resources, especially the labour force, are mutually dependent and a general theoretical framework will be required to investigate the socioeconomic factors which determine the appropriate levels in both cases.

This type of approach to the concepts of sustainability, sustainable development and ecology can be extended from traditional, specialized approaches to investigating environmentally friendly technologies, ecological evaluations of particular technologies, such as nuclear energy, or considering the ideologies of different environmental movements in the context of a general theory of social life or, at least, a general historiosophy. The basic premise of this extension is relatively simple: the technological and economic determinants of history include the environmental determinants of technology and the economy and all these different factors can be investigated together using the same methods, largely based on the social sciences. The Marxist tradition of the so-called materialistic view of history is probably not the only possible source of such methods. However, its stress on the role that technological development plays in history gives it a particularly appropriate conceptual framework. According to the general thesis of Marxist historiosophy, in the long term history will tend to follow a smooth, harmonized path of development, thereby reducing the tensions between "material" and "spiritual" factors. "Material" factors can then be understood to include environmental restrictions, such as the limited availability of natural resources.

The question remains whether this path of harmonization and smooth development can be considered as an objective "historical necessity". However, there is insufficient evidence to give a decisive positive answer, particularly if the causal structure of theory has not yet been fully developed. However, conditions for this path to be taken and even to be the most probable path of development can be worked out. There is currently a lack of empirical evidence of the likely impacts of scarce natural resources on the directions which the technological, socioeconomic and cultural evolution of humanity will go in. Indeed, the opposite situation generally holds, with economic and socioeconomic policy in most countries, America, as well as China, India and Russia, persistently ignoring the fact of the limited nature of natural resources and doing very little to promote sustainable development at the global level. However, this limited attention to sustainable development is not particularly remarkable, since critical natural resources are not expected to run out in the immediate future and people are rarely conscious of

faraway dangers. From the point of view of a materialistic understanding of history, it would be unreasonable to expect that a purely theoretical awareness of the possibility of environmental crisis would have a stronger impact on macroscale economic trends than current pressures to the unsustainable exploitation of natural resources. However, if consistent rules of socioeconomic evolution are assumed to hold and to cover the relationships between the environment and society, we can learn from the history of labour force exploitation. In some periods and societies, a scarcity of labour and, in others, the needs of economic or socio-political stability were the underlying reasons for moving away from exploitation to a more sustainable use of the labour force. This raises the question of whether similar trends are operating in the case of the exploitation of natural resources. In the long term and on a global scale this is probably the case. However such trends may not be operating in the short term or at a local level, since societies which are not isolated are able to use natural resources unsustainably if there are sufficient local and short term benefits, due to the possibility of importing resources from other societies and regions. For instance, in recent times the Chinese and Indian economies have been growing very rapidly and consuming imported raw materials and energy at a very high rate. A similar situation existed in the rapidly expanding societies of European capitalism in the nineteenth century. They required external markets both to maintain a balance of trade and to provide employment for the labour force in order to maintain a minimal level of sociopolitical stability. However, if a more idealized model of socioeconomic evolution is assumed, with the local socioeconomic systems isolated from each other, then the conditions for a balance of trade, reasonable levels of employment and appropriate uses of natural resources, as well as the relationship between the environment and society and the conditions for stability or the smooth evolution of the local socioeconomic systems will be very different.

The traditional language of historical materialism provides a number of tools for the analysis of the socioeconomic evolution of isolated systems: The Marxist theory of **ground rent** leads to a recognition of the influence of the scarcity of natural resources on economic processes. However, land is not the only limited natural resource. In addition, it is not only natural resources (in the sense of other than human resources and resources which are not affected by technology or society) which are limited, counter to the implicit assumptions of Marxist historiosophy. Furthermore, the socioeconomic basis and superstructure of society as well as the economy in the pure sense can be affected by resource limitations, particularly with regard to conditions for their stability. However, traditional Marxism was less interested in the conditions for stable growth than the causes of instabilities (revolutions), for instance crises of capitalist overproduction. Therefore, it would be somewhat unrealistic to expect the concept of sustainable development, particularly with regard to the social, political and cultural aspects of development, to have been formulated in traditional Marxist theory in the nineteenth or the first half of the twentieth century. However, the general principles and conceptual framework of historical materialism can now be applied to developing a theory of sustainable development, particularly after facing the new challenges of the second half of twentieth century and at the start of the twenty-first century. These challenges

include the energy crisis, pollution and the greenhouse effect, structural unemployment in highly developed countries, the need for a new (theoretical and practical) approach to the balance between the availability of labour and employment, and the information revolution. They have resulted in new types of social consciousness, including environmentalism and ecological awareness and new forms of interaction with socioeconomic structures.

These questions will be considered in my further work.

Part 2

On Higher Education and Cases of Institution Building

Norbert Derner*

Mutual Relationships of Personal Interests and the Evolution of Complex Social Systems

Abstract: Based on recent research in different fields this text explains, applies, and investigates holistic approaches to thinking, teaching, and learning. Emphasizing the role of the individual in a climate of international changes we will discuss some factors that support learning environments for both students and adult learners. This model of innovation provides readers with a framework for examining and establishing variable training programs in education, business and government with a special focus on the demands of post-industrial societies and the individual's relation to it. What follows is not the only approach that could evolve from these basic principles, but our approach offers realistic possibilities for progress in real-life applications including examples of evaluation methodologies. According to this systems model we will emphasize the need for further inter- and transdisciplinary research to answer the question of how far we can go using synergetic conceptualisations to carry out the necessary changes and adaptations in social and economic behaviour towards a sustainable future in our complex evolutionary world.

1. Introduction of the topic

The neo-liberal shift in political and social philosophy that occurred in the last decades provided both the opportunity and the impetus for increasing individualization. This change in the life perspectives of many people may be characterized by the popular phrase "anything goes". But recent discussions about individualism and community argued more and more for a reformulated educational policy in post-modern conditions especially as responses to the crisis of the welfare state. These approaches aimed at filling the gap left by an increasingly remote and indifferent state apparatus and other moral institutions like family and religion. However, in Western post-industrial societies as well as in new Eastern democracies there are controversial views and no strong ideas about what constitutes the moral issue in collective behavior and action. It is obvious that this problem cannot be solved only by legislative or administrative acts. Therefore education will be vitally concerned with personal interests of individuals, processes of self-organisation in cognitive and motivational systems of perception and action and their implications for lifetime learning in the pursuit of sustainable development (Derner, 2001).

2. Theoretical basis

Until now, only a few educational programs addressed issues of motivation and value-orientation in the process driving curriculum change in a systematic and comprehensive way. However, it seems to be quite clear to all involved in education that in modern and liberal societies there is very little chance to establish a system of

* Prof. Dr. Dr. habil Norbert Derner, Technische Universität München, e-mail: n.derner@ws.tum.de

values or moral standards in a top-down design by political, religious or ideological pressure. Instead of a hierarchical approach people in democratic and multi-cultural societies must be motivated to combine their personal interests with the moral issue in collective behavior and action.

Following this idea, we have to look at valid theories of motivation and interest. There is no doubt that all human behavior is motivated, despite some basic needs, by learning and value-oriented expectations. This basic idea is not so trivial as it seems. Looking back to the years around the middle of our century, it is really surprising that the leading theory on learning and action at this time, behaviorism, could almost totally ignore any internal states of human beings like motivation, personal interest or moral standards. The main assumption of the behavioristic psychology was that reactions of individuals are determined by environmental stimuli only. Far beyond this conceptualisation of behavior in terms of stimulus-response-reinforcement, the major emphasis of the motivational approach is on what a person is willing to do especially in situations which provide a chance for initiative and decision-making between alternative procedural modes. Because the psychology of motivation has made most progress in the area of achievement-motivation based on the work of McClelland and Atkinson and the development of adequate measurement (Heckhausen, 1991), this field was predestined for an attempt to transpose scientific findings into practical action (Derner, 1990 and 1995).

In a long-term study of about ten years, we tried to measure and to improve the motivational effects of the case- study-method originally created and developed at Harvard Business School. The results of several teaching experiments on management training in Germany and in the Philippines showed that we can understand the motivational effects better in a project-specific framework of personal interests than on the basis of the very general theory of achievement motivation. The research on project-specific motivation and personal interests has been expanding over the last two decades to include a wide range of approaches to the role of interest in learning and human development (Hidi, Renninger and Krapp, 1992). Looking more closely at these theories and the empirical findings of interest research, one can examine three major aspects : Firstly, cognitive factors and elements of competence in a specific person-object relation. Secondly, a strong emotional pattern is assumed, associated with actions based on personal interest. Finally, self-determination and value-orientation regarding the actions, action outcomes and outcome consequences. Thus, we need not be surprised to see that this approach reflects rather similar categories of behavior as does the research on the achievement motive. However, interest theory is less concerned with success and failure, but focusses on a long-term and value-oriented involvement between the interested individual and a special class of objects (Derner, 1996). The interest-oriented interaction of a person with the environment is seen as a process in which the activities pursued are essentially self-chosen for intrinsic reasons rather than for material rewards or other external reasons for participation (Krapp, 1992). Therefore, criticism may argue that education along these basic principles emphasizes personal interests too much, forming an egocentric personality unwilling and unable to reflect the demands of a unified society and its moral issues. This risk provoked an ongoing debate around the role of personal

interests of the individual, on the one hand, and social welfare on the other. Until now, this debate appeared to have been won by those who take into account the positive effects of self-organization and the interdisciplinary theory of synergetics created and still promoted by Hermann Haken and his co-workers. Though synergetics originated from natural sciences with famous applications in laser physics and fluid dynamics, "it does not represent any physicalism, but establishes a general relationship between the individual parts of a system that produce macroscopic features. These relationships can be formulated as rigorous mathematical laws" (Haken, 1990, p. 3).

3. Practical applications

The question is, how can we combine this scientific approach with related techniques of instruction to the solution of complex problems. Rather than wait for a general curriculum change, we can introduce the findings of interest research and the concepts of synergetics to study processes of self-organization in educational settings in order to improve better learning and appropriate development. Our approach based on concepts of intrinsic motivation and synergetics gets strong support from recent research done in the field of sociology. In their excellent exploration of the relationship between individualization and integration, BECK and SOPP (1997) pointed out that education according to personal interests is vital in securing the moral issue in democratic societies. Each essay in this volume highlights specific aspects of social interaction and how communication affects the notion of self and its relation to issues of community, helping researchers to become critically aware of synergetic processes.

Similar contributions derive from the assessment of learning organizations. In today's economy, more and more companies are experiencing rapid changes in competitive settings and need new strategies to link together individual and integrated learning (Wigand et al., 1997). Traditional hierarchies are replaced by decentralized structures characterized by both autonomy and cooperation building organizations as learning systems. Their key concepts concerning personal mastery, mental models, shared vision, team learning and, above all, system thinking (Senge, 1990) should provide an effective incorporation of personal interests into a sustainable development of the whole organization.

Using these principles, the Saguaro Seminar is an exciting initiative of Robert D. Putnam at the John F. Kennedy School of Government at Harvard University in the United States of America. The project focuses on developing strategies and efforts to increase civic commitment. In his ongoing research, Putnam (2000) shows how we have become increasingly disconnected from social and democratic structures and how we may reconnect. Reflecting a well-known phenomenon in the field of sports, he titled his book "Bowling Alone".

In fact, in the field of sports, there were dramatic changes in the last few decades initiated by mass-media, big industry and commerce significantly affecting some basic values of sportsmanship. Facing these problems, we tried a practical application of the holistic approach to physical education. Based on our prior research (Derner

1996), in a recent study we used a new curricular strategy derived from the basic principles of synergetics, emphasizing the so-called order and control parameters. The interest theory of learning and action served as an additional background. The participants in the experiment were more than 200 adults aged between 23 and 51 years.

At the beginning of the teaching experiment we found a very broad spectrum of answers to a questionnaire consisting of 40 items with the headline: "Why do you practice physical activity"? The motivational structure could be described by at least 6 different factors.

Half a year after finishing the experiment, we found a dramatic change: A factor analysis of 178 data samples provides evidence that we could now identify only one main factor "sport interest" matching the theoretical concept of a specific subject-object relation, value orientation, and flow experience (Csikszentmihalyi 1990). Such a relation is oriented primarily towards the subject matter of sports and not mainly around success and failure or other aspects and can serve as a guideline for further cognitive, emotional and value-based learning and behaviour. A second factor can be recognized in instrumental activities for fitness and health. Another approach on a very similar theoretical basis was made in the field of human health and quality of life. The research on salutogenesis, a concept introduced by the famous Jewish medical sociologist Aaron Antonowsky, proved that the evolution and maintenance of health needs an active role of individually and interpersonally meaningful behaviour patters. The essential requirement is not only the avoidance of risk factors, but the positive development and realization of individual and collective life-styles (Antonovksy 1985). In other words, the evolution of health and well-being can only be understood within a cooperative effort of many disciplines in a synergetic framework.

4. Conclusions

For a long time, both education policy and the social welfare state have tended to solve problems by a top-down approach. However, in times of global competition and increasing individualization, we have to trust in bottom-up effects to implement reform ideas in educational settings. The research most relevant to today's debate about the proper balance between public and private affairs takes place in the field of self-organization in schools as well as in business and management. The challenging theory of synergetics provides an interdisciplinary framework for promoting the key concepts of order and control parameters. With that observation, we raise an important question which a broad discussion will have to answer: How far we can go, applying amathematical conceptualisations to a deeper analysis and for a better understanding of the necessary changes and adaptations in social and economic behaviour, towards a sustainable future in our complex evolutionary world.

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R. Garleja, I. Kerpe*

Innovative Changes in the Social Demand for Lifelong Education

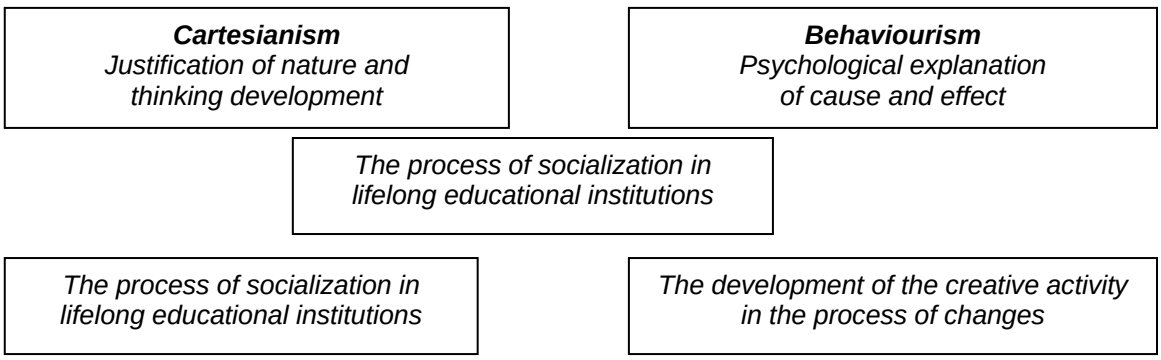
Lifelong education is the driving force of intellectuality, the reason behind the personality of an individual and the precondition for socialization. Lifelong education and socialization is a continuous process in the life of a person. Life itself creates this necessity, development, dependency, and deficit of information.

Each person must keep up with time, and obtain knowledge and experience to create value orientations. The main way a person is socalized is by his or her value orientations. During the socialization process, a person gains experience, knowledge, social standards and cultural values. Besides, the objects of socialization undergo changes. The 20th century was a special time for changes in the mentality of society as well as in that of each person. Changes signify a new position on things and phenomena in comparison with previous ones. Changes imply development contradictions, a new and quantitatively higher position in the cultural, economic and social development of phenomena.

In Latvia, changes are taking place in the context of building up a more open society as the country advances towards the European Union. The changes manifest themselves in goal-directed orientation, development of communication systems, technological innovations as well as in the structural changes in people's needs, the policy of environmental protection, restructuring of the educational system, and revaluation of the Latvian heritage.

Changes in the social environment are an innovative paradigm of lifelong education. It provides society with the opportunity to be in step with the times and be aware of its role in time and space. It is the way to a social identity. Paradigm changes refer to pedagogics, philosophy of education, axiology and other areas of the humanities. Through pedagogical theory one can understand the correlation between conditions, causes and the ways a personality develops.

The directions innovative changes take in lifelong education can be graphically shown in the model of socialization in education:



* Prof. R. Garleja, Lecturer I. Kerpe, University of Latvia, Faculty of Economics and Management, 5 Aspazijas blvd. Riga LV – 1010 Latvia, Tel: 7034615, Fax: 7034614, e-mail: ella@lanet.lv

Changes in education include knowledge, theories, methods, opinions, evaluation of significance, perception, adoption, changes in professional competence, and changes in the need for hierarchical structures. The philosophy of education is closely connected with understanding the nature of man, values and ethics, morality, economics, politics, history, culture, and other intellectual values.

Let us turn to the education of values. Such theories as axiology, philosophy, sociology, pedagogics, and psychology are applied in this process. Axiology studies the interdependence of values and their connection with nature, culture, society, and personality. Axiology is a philosophical study of values.

Pedagogics investigates the process of intellectual education, according to which individuals develop a need to understand themselves and to create self-consciousness and self-actualization using cognitive, creative, axiological, and transcendental methods and means. Pedagogics has the function of creating a person's attitude and point of view and of facilitating the transformation of intellectual values and the harmonious development of a personality.

The aim of pedagogics is to ensure and promote the inborn inquisitiveness of an individual through self-actualization, revealing itself in cognitive and affective actions and ensuring the holistic functioning and the development of the inborn potency of an individual. Changes in the educational system give reason to revaluate the theories of pedagogics and the efficiency of its application. For example, the focus on overloading study programs in the process of acquiring knowledge leads to the dominance of conceptual knowledge, diminishing the values and creativeness of a person, which results in a lack of self-actualization. The task of acquiring knowledge should not reflect a symbolic truth of life, i.e. to accumulate and memorize facts, but should lead to self- actualization in the action of cognition. This process must last a person's lifetime helping him or her to develop intellectually. Intellectuality creates a holistic understanding of reality and the awareness of values.

There is no unified system of values. Each science has its particular domain of values. Besides, systems of values are changing with time. Even during their lifetime, people can change their attitude towards values. To design a program for lifelong education, the task is to determine the components of the process of intellectual and moral development in a particular cultural environment. Axiology should show the place of particular values in the structure of the world entity and how they reveal themselves in the real life of an individual.

Back in the 1930s, J.Students reached the problem of relativity in education. He wrote: "The unequivocal character of a value shows that the value in its individual bounds is single… but if it did not have its unequivocal character, it would not be able to make a scientific, legal, moral, artistic, religious evaluation. In such a case everybody would have his own truth, own virtue, own beauty, own holiness." (1., 192). "The meaning of a value lies in its perfect character, i.e., unchangeability… It is true that in different times different people have their own opinion about truth, virtue, beauty. But it does not shatter the unchangeable character of a value. People change their opinion about values but the values themselves do not change." (14.,93). A person himself must answer the question "What is a value?" Is money a value? Is time a value? Is a person a value? Is education a value? But not everybody feels a

need to answer these questions. It depends on the significance of intellectual needs and the intensity of expressing oneself, value orientations, intelligence, and strategy of life. The acquired intellectual values make an individual choose goals, sense of life, and means of action.

Lifelong education must help people create their own attitudes towards intellectual values, art, education, culture, and towards themselves. Education as a value manifests itself in thinking, in the degree of ability to perceive the outer world, intellectual power, and order.

The existence of a value, whether it is an object, phenomenon, attitude or anything else, determines its significance in the life of a subject. An individual system of value orientations is the most important aspect in the development of a personality. It becomes consolidated as a result of the life experience of an individual, which follows from interrelations with the environment and society. Such a system ensures the stability and maturity of a personality, determines needs, interests, and ambition.

Values ensure the strategic perspectives of goals in life and motivate the actions of a person. They determine the moral basis for behaviour. Society is concerned that people accept hereditary and established principles of behaviour.

In this context, the pedagogic process is closely connected with the student's and educator's world view and opinions.

Historical experience shows that many important and topical problems in society can be solved with the help of particular standards which are willingly accepted by society. In such a way, ideal standards are established, which become an example and a guide for anyone who has accepted them.

The contemporary directions of pedagogical philosophy in Latvia related to axiology and pedagogics of religion can be divided into two groups: conservatism and liberalism. After examining how these directions have changed, we can understand the process of change and the continuity of the development of a personality and what society wants to receive in the process of lifelong education.

To express themselves, people must learn during their lifetime to develop and use their intellectual experience, skills and potential. This idea belongs to the researchers of humanist psychology, A.Maslow and K.Rodgest (K.Rodžestam). Psychologist A.Karpova, referring to Maslow's theory of differentiation and self – actualization, divides people into two groups: those who consider the experience and knowledge of transcendentalism to be unimportant and those who strive for emotions, but consider the experience of transcendentalism to be important. The latter group is more often aware of mysticism. They feel the transcendent aspects of life. While perfecting their knowledge, they develop the ability to feel and perceive the Universe as a whole, diminishing the significance of the image of a person himself. This example leads to the conclusion that, in order to organise and design lifelong education, it is important to conduct a fundamental investigation of the intellectual development of a person in the context of current social changes.

The context of lifelong education is determined by the attitude of society towards values, motivation to act, interest in innovations as well as the popularity of

study courses. The latest sociological research in Latvia (2002) shows that the most popular study programs, according to the survey of the Council of Higher Education, are entrepreneurship and business administration (39%), science of law (30,7%), mathematics and statistics (12,39%), computer science (11,8%), humanities (10,5%) social sciences (9,6%), theology and religion (0,7%). This information shows the public's preference for certain courses. This should be taken into account while designing the programs of lifelong education, the structure and basis being in compliance with the Memorandum of Lifelong Education in the European Union.

CONCLUSION:

The necessity of lifelong education is not only related to economic changes and the demands of a free market economy. Lifelong education is the precondition to solving the problems of revaluating the significance of values, the search for the meaning of life, the changes in a person's interests and self - evaluation and other philosophical, axiological, and psychological problems.

A person must learn to understand the development of current processes, the objectivity of changes, and they must determine the correlation between cause and effect. It is a continuous process in which people comprehend their existent and newly obtained knowledge and use it in their behaviour and attitudes.

The basis for acquiring values is formed by theoretically logical judgments and freedom of choice that act in a vertical direction, as well as psychological factors (goals, interests, need for cognition) which act in a horizontal direction. The values are formed inside a person and develop themselves into external values as an element of culture and social standards.

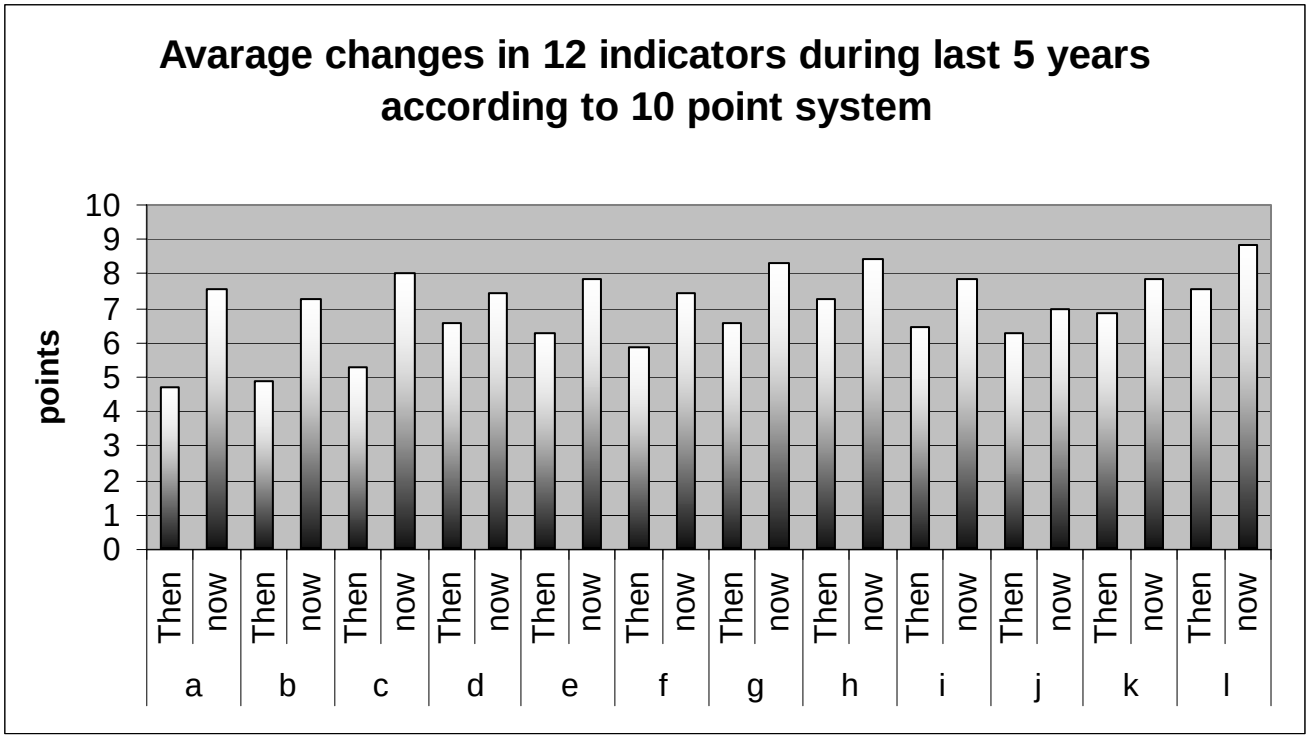
People using cognition and the rules of axiology develop themselves during the whole period of their active life. They learn how to distinguish positive from negative, real from unreal, and they learn to understand other people's thinking Lifelong education helps a person understand himself, evaluate cognitive dissonance, and reveal that which is hidden in subconsciousness.

Lifelong education helps to develop values of emotions, values of cognition, and psychometric abilities. Lifelong education also helps to maintain and develop one's personal identity, realize one's uniqueness, inimitability, and originality. It does not allow a personality to merge with the masses. It teaches how to make oneself bold as well as to feel inner freedom.

The necessity for lifelong education is also determined by changes in a person's interests. The objects of interest are values which continuously develop and need to be revaluated. Changes of interests are products of the awareness and will of an individual, but are determined by objective social conditions which, in their turn, determine the advancement of will and action. Changes of interests are subject to a natural process in the development of a personality that determines the context of lifelong education.

As a result, during their lifetime, people change their attitude towards values. Values, considered essential some years ago, may lose their significance, because we change ourselves.

The changes in students` self-evaluation over a period of five years is shown here. "Then" means five years earlier and "now" means today. The figure shows the evaluation of 170 respondents of the Faculty of Economics and Management at the University of Latvia, using 12 indicators and a 10 point system.



a) Ability to collaborate with other people
b) Thorough understanding, empathy, ability to predict
c) Perception, comprehension, interpretation
d) Potential capacity to do something physical or mental, persistence
e) Belief in a strategy of life
f) Ability to influence
g) Ability of self - control
h) Ability of self – evaluation
i) Understanding of life situations
j) Ability to sacrifice one's personal interests for the sake of others
k) Optimism regarding innovative changes
l) Ability to organize and manage the course of events in life

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Richard J. Bartak*

Bioakademie – Bildungsprojekt zum ökologischen Landbau in der Tschechischen Republik

Summary

Organic farming is a valid alternative to intensive farming. Organic farming only got off the ground after 1989 when democratic changes occurred in the Czech Republic. It now accounts for 5% of all farming in the country, and the Czech Republic comes first in eco-farming among the new member states of the EU. However, there is a lack of high-quality training in eco-farming and a systematic dissemination of knowledge. Though studies in eco-farming are possible at the universities of Prague, Brünn and Budweis, they are only optional or part of other study courses. A textbook is not available. Publications are rare. Meetings with important specialists are limited because of language barriers and a lack of funding for travels abroad.

The Association of Organic Farmers has thus initiated the non-governmental, non-profit "Bio-Academy" project. Part of it is the European Summer Academy for Organic Farming, which has had three successful years. The Ministers of Agriculture of Austria and Czechia have participated, as have EU representatives.

Another part of the project is the first comprehensive textbook on organic farming in Czechia. It is concerned with field production, the cultivation of forage crops, fruit and vegetable growing, viniculture, seed growing and the like. Farmers are considered to be not only producers, but men and women who recreate and redesign agriculture and help to shape the environment of the future. A second volume of the textbook will focus on areas under cultivation in the mountains and in the foreland of mountains, and will also consider business management aspects and marketing. The publisher is ProBio. Funding came from the Czech Ministry of the Environment. The team of authors is headed by Jiri Urban and Borivoy Sapatka (from the Palacky University in Olmütz), both of whom have had 15 years of experience in the field of organic farming.

One part of the book deals with organic farming in the Czech Republic in 2003. The focus is on grass landscapes in and near the mountains and their maintenance. What is missing, however, is a sufficient number of bio-products. The market for biological foodstuffs in Czechia is 0.06% of the overall food market. Research in the field is also inadequate. In other areas, Czechia has achieved the European standards: legal regulations, control, certification correspond to provisions of the EU-Council. Organic products must be labelled nationwide. The Czech agreement that farming can be conventional and ecological on one and the same farm at the same time does not find EU approval.

* Richard J. Bartak, B.Agr.Sc., CSc., Czech Association for Nutrition and Vegetarianism, Honourable Member of SEM Institute for Climate Change, Praha, Czech Republic, e-mail: rjbartak@ecn.cz

Der ökologische Landbau ist eine Alternative zur intensiven Landwirtschaft, die vor allem in der zweiten Hälfte des vergangenen Jahrhunderts das Landschaftsbild ebenso wie die Qualität der Lebensmittel bestimmte.

Derzeit werden in der Tschechischen Republik bereits mehr als fünf Prozent der gesamten Landwirtschaftsfläche ökologisch bewirtschaftet. Die Entwicklung dieser modernen Art der Bewirtschaftung die die Gesetzmöglichkeiten der Natur berücksichtigt, wurde bei uns erst durch die demokratischen Veränderung in der Gesellschaft nach 1989 möglich. Die Tschechische Republik steht beim ökologischen Landbau an der Spitze der neuen EU-Mitgliedsländer. Eine systematische Weitergabe der Erkenntnisse und eine qualitativ hochwertige Ausbildung in diesem Bereich gab es jedoch bislang in Tschechien nicht.

Ökologischer Landbau wird zwar an den Landwirtschaftsuniversitäten in Prag, Brünn und Budweis gelehrt, jedoch nur unregelmäßig im Rahmen der Wahlfächer oder der konventionellen Pflanzenproduktion. Ein Lehrbuch des ökologischen Landbaus war in der Tschechischen Republik bisher nicht verfügbar. Dies gilt auch für die Mittelschulen. Auch die Landwirte in der Praxis haben es nicht besser. Der ökologischen Landwirtschaft widmen sich lediglich das unregelmäßig erscheinende „Bulletin EZ“ (Bulletin für ökologischen Landbau), die „Bionoviny“ (Biozeitung) und die Zeitschrift „Zemedelec“ (Der Landwirt). In allen Fällen handelt es sich um Aktivitäten des Verbandes ProBio oder privater Firmen. Eine Begegnung mit Fachleuten auf hohem Niveau war für unsere Praktiker so gut wie ausgeschlossen (durch die Sprachbarriere, die Unabkömmlichkeit der Landwirte und die Unmöglichkeit der Teilnahme an Konferenzen im Ausland aus finanziellen Gründen).

Deshalb initiierte der Verband ökologischer Landwirte ProBio als nichtstaatliche gemeinnützige Organisation das Projekt **„Bioakademie“,** welches mehrere Ebenen beinhaltet:

International am bekanntesten ist die Europäische Sommerakademie für ökologischen Landbau, die bereits traditionell in der letzten Juniwoche an der Fakultät für Gartenbau der Mendel-Landwirtschaftsuniversität in Lednice in Mähren stattfindet. Bisher kann die Sommerakademie auf drei sehr erfolgreiche Jahrgänge zurückblicken, bei denen die Landwirtschaftsminister der Tschechischen Republik und Österreichs, Vertreter der EU sowie Vortragende und Zuhörer aus den meisten

Ländern der EU wie auch Mittel- und Osteuropas einschließlich des Balkans zugegen waren.

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Die vierte Auflage der Bioakademie fand zwischen dem 30. Juni und dem 02. Juli 2004 statt. Hauptthemen waren: Der Beitritt der neuen Mitgliedsländer zur EU, die richtige landwirtschaftliche Praxis, Gewässerschutz, Wirtschaft und Marketing – alle dies selbstverständlich in seinem Bezug zum ökologischen Landbau. Weitere Informationen und Anmeldeformulare unter: www.pro-bio.cz. Die Bioakademie wird organisiert durch die Verbände ProBio (Tschechische Republik) und Bio-Ernte (Österreich) mit Unterstützung der tschechischen und österreichischen Ministerien für Landwirtschaft und Umwelt sowie weiterer Sponsoren.

Erstes umfassendes tschechisches Lehrbuch des ökologischen Landbaus: Das neue herausgegebene Lehrbuch beschreibt die Entwicklung der ökologischen Landwirtschaft, ihre Einflüsse auf die Umwelt wie auf die Gesundheit der Bevölkerung, es widmet sich den spezifischen Fragen der Feldproduktion, des Anbaus von Futterpflanzen, des Obst- und Gemüsebaus, des Weinbaus und der Saatzucht unter den Bedingungen des ökologischen Landbaus. Der Landwirt hat in der Landwirtschaft nicht nur die Funktion eines Produzenten, sonder er entscheidet mit über ihre Gestaltung und hat einen Einfluss auf die einzelnen Elemente der Umwelt. Aus diesem Grunde werden in der vorgestellten Publikation auch diese Aspekte betont. An den ersten Teil des Lehrbuchs wird sich ein zweiter Teil einer ökologischen Landwirtschaft mit Flächen überwiegend in Vorgebirgs- und Bergregionen eine herausragende Bedeutung hat. Der zweite Teil wird auch die betriebswirtschaftlichen Aspekte und das Marketing behandeln und hierzu Beispiele aus der Praxis enthalten.

Das Lehrbuch wurde herausgegeben durch den Verband ProBio, den Druck finanzierte das Ministerium für Umwelt der Tschechischen Republik. Die Leiter des Autorenkollektivs, Jiri Urban (Verband ProBio), und Borivoj Sarpatka (Palacky-Universität Olmütz), gehören zu den Begründern des ökologischen Landbaus in Tschechien und sind auf diesem Gebiet bereits seit 15 Jahren tätig. Das Lehrbuch im Format A4 hat 300 Seiten und bietet eine Vielzahl an enzyklopädischen Daten zum Thema. Hervorzuheben ist , dass die Autoren tschechische Spezialisten sind, womit das Werk keine aus dem Ausland übernommenen Fakten enthält, sondern praktische Informationen, die ganz auf die Bedingungen der Tschechischen Republik zugeschnitten sind. Graphisch ist das Buch interessant gestaltet: der Text ist in zwei Spalten angeordnet und am Rand der Erklärungen ergänzt, hinzu kommt eine große Anzahl an Fotografien, Tabellen, Diagrammen sowie eine Übersicht der bisher

erschienen Fachliteratur usw. Zur Illustration drucken wir hier einen Teil des Kapitels über die Entwicklung des ökologischen Landbaus in der Tschechischen Republik ab:

Ökologischer Landbau in der Tschechischen Republik im Jahr 2003

Was den Anteil des ökologischen Landbaus im Land betrifft, sind wir zwar in Europa ganz oben, es fehlen und jedoch Ökolandwirte auf den Ackerböden in den produktiven Regionen.

Die ökologischen Landwirte in der Tschechischen Republik haben die meisten der Ziele erreicht, die sie sich vor mehr als zehn Jahren gesetzt hatten, die werden vom Staat anerkannt und gefördert. Im Jahr 2002 bewirtschafteten ökologische Landwirte mehr als 5 % des gesamten Landwirtschaftsbodens in Tschechien. Der ökologische Landbau kommt jedoch überwiegend nur bei Betrieben in Berg- und Vorgebirgslandschaften auf dauerhaftem Grasbewuchs zum Zuge, wo es vorrangig um die Instandhaltung der Landschaft geht. Bioprodukte gibt es zu wenige, es fehlen Fertigprodukte, Gemüse und auch Obst.

Der Markt für Biolebensmittel ist ungenügend entwickelt, sie haben einen Anteil von nur 0.06 % am gesamten Lebensmittelmarkt in Tschechien. Auch die Forschung im Bereich des ökologischen Landbaus ist ungenügend entwickelt und nicht institutionalisiert, es geht eine spezielle Beratung, die Propagierungs- und Aufklärungstätigkeit reicht nicht aus. In den letzten Jahren wurden nicht geringe Fortschritte gemacht, und in vielerlei Hinsicht haben wir das Niveau der westeuropäischen Länder errecht (Harmonierung der Legislative und Annahme des Gesetzes über den ökologischen Landbau, Schaffung eines Kontroll- und Zertifizierungssystems, stabilisiertes System von Fördermaßnahmen usw.). Unter den neuen EU-Mitgliedsländern sind wir zum Zeitpunkt des Beitritts bei der Größe der ökologisch bewirtschafteten Flächen und bei der Entwicklung des Vertriebs im Inland an erster Stelle.

Gesetzliche Regelung, Kontrolle und Zertifizierung

Zum 01.Januar 2001 trat das Gesetz Nr. 242/2000 Slg. über die ökologische Landwirtschaft und über die Änderung des Gesetzes Nr. 368/1992 Slg. (Verwaltungsgebühren) in der Fassung späterer Vorschriften in Kraft. Dieses Gesetz legt die Bedingungen für den ökologischen Landbau und für die Produktion von Biolebensmitteln fest und gibt das System vor, nach dem die Herkunft von Bioprodukten und Biolebensmitteln nachzuweisen und diese zu kennzeichnen sind. Es legt auch ein System fest, wie die Einhaltung dieses Gesetzes zu kontrollieren und zu überwachen ist. Hinsichtlich des Umfangs der behandelten Themenbereiche ist das Gesetz den Verordnungen des EU-Rats Nr. 209/91 und Nr. 1804/1999 gleichwertig, die den ökologischen Landbau in den Ländern der Europäischen Union regeln. Das Gesetz wird begleitet durch die Bekanntmachung des Landwirtschaftsministeriums Nr. 53/2001 Slg. vom 13. Februar 2001.

Mit der Aufsicht über die Einhaltung des Gesetzes hat das Landwirtschaftsministerium die Kontrollorganisation KEZ o.p.s. (Kontrolle des ökologischen Landbaus“) beauftragt, die gleichzeitig den Herkunftsnachweis der Bioprodukte und Biolebensmittel durchführt. KEZ o.p.s. werden von der Europäischen im Verzeichnis der Drittländer genannt, deren Kontroll- und Zertifizierungssystem im Bereich der ökologischen Landwirtschaft mit der EU kompatibel ist. Dank dem Kontroll- und Zertifizierungsprogramm hat KEZ o.p.s. eine weltweit gültige Akkreditierung im Rahmen des Akkreditierungsprogramms IFOAM erhalten.

Landesweite Kennzeichnung von ökologischem Landbau und Biolebensmittel in der Tschechischen Republik

Die gleichzeitige Produktion von ökologischen und konventionellen Erzeugnissen im selben Landwirtschaftsbetrieb weckt nicht das Vertrauen der Verbraucher, ermöglicht jedoch die Einbindung auch großer Firmen in den ökologischen Landbau.

Beachtenswert ist, dass weder die Ratsverordnung nr. 2091/91, welche in der EU gilt, noch unser Gesetz über die ökologische Landwirtschaft die völlige Abgeschlossenheit ökologisch wirtschaftender Betriebe verlangt. Dies heißt, dass es möglich ist, parallel konventionell und ökologisch zu produzieren. Die Regeln dieser parallelen Produktion sind genau definiert. Zum Beispiel dürfen nicht im konventionellen und im ökologischen Betriebsteil die gleichen Pflanzenarten angebaut werden oder die gleichen Kategorien oder Nutztypen von Wirtschaftstieren gehalten werden. Der Kontrolle unterliegt sowohl der konventionelle als auch der ökologische Teil des Betriebes. Der Betrieb muss getrennte Aufzeichnungen und eine getrennte Buchhaltung führen u.ä.

Es handelt sich hier allerdings um eine Kompromisslösung und es gibt in der EU massive Bestrebungen, die Möglichkeit einer solchen parallelen Produktion nicht weiter zuzulassen. Die Richtlinien der ausländischen Verbände, die von deren Mitgliedern über den gesetzlichen Rahmen hinaus eingehalten werden (z.B. Bioland, Demeter, Bio Ernte, Bio Suisse u.a.) erlauben kein Nebeneinander von ökologischer und konventioneller Produktion! Deshalb sind auch die Markenprodukte dieser Verbände auf dem Markt gefragter. Der Verband der ökologischen Landwirte in der Tschechischen Republik ProBio hat im Jahr 2002 eine Vereinbarung mit dem deutschen Verband Bioland geschlossen, die es dem Verband ProBio ermöglicht, die detaillierten Produktions- und Verarbeitungsrichtlinien von Bioland zu nutzen. Ihre freiwillige Einführung bei den Betrieben des Verbandes ProBio ab 2004 verfolgt das

Ziel, das Vertrauen der Verbraucher in die von ihnen erzeugten Bioprodukte zu stärken.

Jahr	Zahl der ökologisch wirtschaftenden Betriebe in der Tschechischen Republik	Gesamtgröße der ökologisch bewirtschafteten Flächen in der Tschech. Republik (in ha)	Anteil des ökol. Landbaus an der gesamten Landwirtschaft
1990	03	480	-
1991	132	17 507	0.41
1992	135	15 371	0,36
1993	141	15 667	0,37
1994	187	15 818	0,37
1995	181	14 982	0.35
1996	182	17 022	0,40
1997	211	20 239	0,47
1998	348	71 621	1,67
1999	473	110 756	2,58
2000	563	165 699	3,86
2001	654	218 114	5,09
2002	717	235 136	5,50“

Grundlegende Statistik

In der Tschechischen Republik waren zum 31.12.2002 insgesamt 717 ökologische Landwirtschaftsbetriebe tätig – große Firmen wie auch kleine Privatbetriebe -, die insgesamt 235 136 Hektar Produktionsfläche bewirtschafteten, das heißt 5,50 % der gesamten Landwirtschaftfläche in der Tschechischen Republik. Unter den ökologisch bewirtschafteten Flächen haben solche mit dauerhaftem Grasbewuchs mit 90,13 % den größten Anteil, es folgen Ackerböden mit 8,31 %, Dauerkulturen mit 0.,38 % und sonstige Flächen mit 1,18 % der Gesamtfläche. Von den registrierten Landwirtschaftsparzellen befanden sich etwa 77 8000 Hektar Boden in der Umstellung auf die ökologische Bewirtschaftung. In der Tschechischen Republik waren zum genannten Stichtag 92 Produzenten von Biolebensmitteln sowie 164 Personen registriert die Biolebensmittel und Bioprodukte in den Umlauf bringen (weitere statistische Daten finden sich unter www.kez.cz). In der Tschechischen Republik sind zwei Verbände ökologischer Landwirte registriert (Libera, ProBio).

Unter den Biolebensmitteln finden sich pflanzliche Produkte (Erzeugnisse aus Dinkel und Buchweizen, Bachwaren, Nudeln, getrocknetes und frisches Obst, Gemüse u.a.), Milchprodukte (Joghurt, Käse Quark, Milch) und Fleischprodukte (Rind, Schwein, Lamm und Geflügel). Biolebensmittel werden sowohl in Supermärkten angeboten als auch in kleinen Geschäften, insgesamt gibt es in ganz Tschechien etwa 300 Verkaufsstellen. Nach einer Umfrage haben 50 durch den Verband ökologischer Landwirte ProBio registrierte Geschäfte in ihrem Sortiment mehr als 50 % Biolebensmittel. Die einzelnen Arten von Biolebensmitteln sind in diesen Geschäften jedoch ungleich vertreten.

Fördermittel

Fördermittel für den ökologischen Landbau in der Tschechischen Republik wurden ab 1998 erneut eingeführt und waren der Hauptgrund für den großen Zuwachs ökologisch bewirtschafteter Flächen in unserem Land. Die Mitten wurden in den Jahren 1998 – 2003 auf der Grundlage einer Regierungsverordnung ausgezahlt, welche Programme zur Förderung der Nichtproduktionsfunktion der Landwirtschaft, zur Unterstützung von Aktivitäten der Landschaftspflege sowie Hilfsprogramme für weniger begünstigte Regionen festlegte. In allen Fällen handelte es sich um gemeinsame Programme der Ministerien für Umwelt und Landwirtschaft. Die praktische Seite, das heißt die Registrierung der Landwirte und die Auszahlung der Fördermittel, war Aufgabe des Landwirtschaftsministeriums. Dieses Förderprogramm war bereits ausgearbeitet im Hinblick auf den Beitritt unseres Landes zur EU und stand im Einklang mit den Landwirtschafts- und Umweltprogrammen der EU.

Im Jahr 1998 erhielten tschechische Landwirte für ihr ökologisches Wirtschaften zusätzlich zu anderen Fördermitteln, die ihnen gleichermaßen wie den konventionellen Betrieben zustanden, insgesamt 48 091 00 CZK (in Durchschnitt 2, 376 CZK/ha) im Jahr 2000 bereits 89 101 971 CZK (durchschnittlich 804 CZK/ha). Die Förderung wurde jeweils auf Grundlage der zertifizierten ökologisch bewirtschafteten Fläche im vorangegangenen Jahr ausgezahlt und es wurde mit Hilfe eines Punktesystems berechnet. Ab 2001 (Gültigkeit der neuen Regierungsverordnung Nr. 5005/2000 Slg.) gilt nunmehr ein fester Satz für jeden Hektar ökologische bewirtschafteten Fläche. In den Jahren 2001 – 2003 waren die Förderbeträge für den ökologischen Landbau in der tschechischen Republik wie folgt:

- Obstgärten, Weinberge, Hopfenfelder:	3 500 CZK/ha
- Gemüse auf Ackerboden:	3 500 CZK/ha
- Ackerboden:	2 000 CZK/ha
- Gradbewuchs:	1 000 CZK/ha

Ab dem Beitritt der Tschechischen Republik zur EU gilt der Horizontale Plan zur Entwicklung des ländlichen Raumes (HRDP), welcher Landwirtschafts- und Umweltprogramme umfasst, deren charakteristische Maßnahme gerade die Förderung des ökologischen Landbaus ist. Für das Jahr 2004 wurden für die ökologische Landwirtschaft Förderbeiträge in folgender Höhe geplant:

- Dauerkulturen:	12 235 CZK/ha
- Gemüse und Spezialkulturen auf Ackerboden	11 050 CZK/ha
- Ackerboden:	3 250 CZK/ha
- Grasbewuchs:	1 100 CZK/ha

Wichtige Kontakte

Kontrola ekologického zemedelstvi /KEZ), o.p.s
(Kontrolle des ökologischen Landbaus)
Podebradova 909
53701 Chrudim
Telefon und Fax: 469 622 249
E-mail: kez@kez.cz
www.kez.cz

Ministerium für Landwirtschaft der Tschechischen Republik
4050 Abteilung für Strukturpolitik und Entwicklung des ländlichen Raums
Referat Ökologie
Resnov 17
117 05 Praha 1
Telefon: 221 811 111, 234 431 111
www.mzw.cz

ProBio – Verband ökologischer Landwirte
Nemocnicni 53
787 01 Sumperk
Telefon: 583 216 609
Telefon und Fax: 583 215 589
E-mail: pro-bio@pro-bio.cz
www.pro-bio.cz

EPOS – Bund der Berater für ökologischen Landbau in der Tschechischen Republik
Vitezslava Nezvala 977
67 571 Namesti nad Oslavou
Telefon: 568 620 541
E-mail: hejatkova@cmcnamest.cz

Vijaya Sherry Chand, Elmar A. Stuhler and Sasi Misra*

The *Fachhochschule* System of Higher Education: University of Applied Sciences, Landshut and University of Applied Sciences, Freising-Weihenstephan

A personal preface

Two of us (Vijaya Sherry Chand and Sasi Misra) are academics based in Ahmedabad, a city in western India. The third author, Elmar Stuhler, is based in Germany. The collaboration amongst the three of us is indicative of our desire to cross national boundaries in order to understand institutional development in higher education from an international or a cross-cultural perspective. The context for this attempt is provided by the serious debate in developing countries like India on the need for higher education to be 'application-oriented', so that the products of the system can immediately apply their knowledge to meeting national needs; a "pure" academic training is often seen as irrelevant to the needs of rapidly developing economies. At the same time, concern has also been expressed about the need for education to inculcate values that reflect a concern for sustainable human development. Both these strands were integrated by Mahatma Gandhi (1869-1948), who is better known as the "father" of India's struggle for freedom from Great Britain, into what he called his philosophy of "basic education". The educational theory that he derived from it, however, has not been prominent in educational discourse in India. Today, only a few rural colleges continue to base themselves on Gandhi's educational approach.

The theory and the social philosophy that underpins its practice no doubt evolved in the specific historical and social context of colonialism that India experienced prior to 1947. Gandhi wanted to see colonial education give way to a system that emphasized an alternative concept of sustainable progress and development, and valued an integration of manual work with intellectual work in the curriculum; "work" was seen as a medium of learning. Without doing injustice to the complex assumptions that the theory makes, the approach, as it is applied in the few colleges that still follow it today, can be summarized as follows (see Chand 1996 for a detailed discussion). Gandhi emphasized the integration of fact and value, cognition and feeling, 'subject' and object, learner and environment, the human being and nature—an emphasis which was the foundation of his notion of *ahimsa* or non-violence (Parekh 1989: 155). Secondly, in contrast to the absolute and objective truth and knowledge claims of modern scientism, Gandhi emphasized the contexuality and relativity of all human knowledge. It is this radically alternative vision that various

* Vijaya Sherry Chand, Sherry Chand Vijaya, Prof. Dr., Indian Institute of Management, Vastrapur, Ahmedabad 380 015, E-mail: (viijaya@iimahd.ernet.in).

Stuhler, Elmar, A., Dr. WACRA EUROPE e.V., Hochackerstrasse. 07, D-85356 Freising, Tel +49/(0)8161-66767, E.mail: (stuhler@wzw.tum.de).

Sasi Misra, Prof. Dr. (Emeritus:Indian Institute of Managment, Vastrapur, Ahmedabad, India), Now at Entrepreneurship Development Institute of India, Ahmedabad, Gujarat, India, Tel (91) (079) 23969153, 23969158 E-mail:(ediindiad1@sancharnet.in).

post-modern, environmentalist and politically-conscious groups advocate today as humane and sustainable. Thirdly, education and "training" are organically linked, and the combination of the two has to be based on the fundamental assumptions of the goodness of human beings, cooperation and "correlated action"—awareness of the effects of action on the self, society and nature. These assumptions also relate to contemporary concern about what is referred to as "sustainability"—of resource use, development and human society in general. The integration of education and training is best captured by a couplet from the *Kathopanishad*, a sacred text of the Hindu religion, which has been adopted by one of the colleges as its motto: *Avidyaya mrityum teertva*; *Vidyaya amritam ashnute*. Loosely interpreted, it means that a person who has *avidya* (technical or applied knowledge) overcomes the sadness of death, and with *vidya* (knowledge of the humanities) he or she achieves *amrit* or peace of mind and a conscious feeling of indebtedness to wider society. In recent years, this integration has also taken the form of specific curricula for 'socially conscious' entrepreneurship, in a few colleges.

This model of education, indigenous to India, but marginalized in its own context, provides the backdrop to the efforts of the Indian authors to study institutions specifically dealing with applied knowledge and application of training, and hopefully presenting an alternative model of education. Thus, we have studied institutional development in a variety of settings, with a fairly strong focus on educational institutions that may be different from the traditional universities or closely related to them. Some of them may also be moving towards a 'university' identity (Misra and Chand 1999; Chand and Misra 2001). Examples of such systems and institutions have included the Technikon education system in South Africa (see http://www.iimahd.ernet.in/~vijaya/Pentechnikon.pdf), the Namibian Institute of Mining and Technology, the Mauritius College of the Air, and in India, a few technical/ management education schools. The Fachhochschule education, with its application orientation and immediate use of academic technical knowledge in the world of work, is yet another illustration of a model of education that complements traditional university education. This paper describes the Fachhochschule system of higher education in Germany, an "application-oriented" model of education that is not well known outside the country. It draws on the experiences of two Fachhochschule institutions—the University of Applied Sciences, Landshut and University of Applied Sciences, Weihenstephan, to illustrate some of the issues the Fachhochschule system has had to face.

Introduction

The Fachhochschule system was formally established in 1969. The system's roots, however, are in the building trades and engineering schools of the nineteenth century. These schools, and the Arts and Crafts Schools and Higher Commercial Colleges, which also dealt with application of knowledge, were integrated under the label "Fachhochschulen". The demand for such a system first arose in the late 1950s. Around that time a serious shortage of engineers led to a policy debate on the ability of the schools that were in existence then to meet the demands of a growing economy. In addition, two factors which supported the establishment of a new system

were: (a) the graduates of the engineering schools themselves began to demand more recognition for their qualifications; (b) state policy was unambiguous about increasing the proportion of academically qualified youth. In late 1968, a national agreement was reached to establish the "Fachhochschule sector". The first batch of Fachhochschule institutions was created in 1969, with each new Fachhochschule being derived from one or more of the older schools that were in existence. Though this was the first step, it was recognized at that time that new institutions would add to the size of the sector. The initial years were marked by simple attempts to combine academic qualifications with vocational training, but these quickly evolved into a distinctive 'Fachhochschule education' in the institutions that were established later. The mission of such education was defined in terms of preparing students for "applications-related training" so that the graduates would enter the professions with the ability to apply "academic knowledge and methods".

The 'applications-related' mandate that was given to the Fachhochschule system was different from the well-established role of the university system. As the 1968 agreement implied, the key difference between these two systems in higher education was the university system's responsibility for research. However, the Fachhochschule Act of 1971 allowed the Fachhochschule system the discretion to undertake research. In 1979, research was made mandatory, but such research had to be directly linked to the development of teaching. In practice, the scope of the research undertaken over the years in the Fachhochschule has widened, though financing such research has become problematic in recent times. The evolution of the research function in the Fachhochschule system highlights the movement towards the theme that is often quoted as characteristic of the two higher education systems: "different, but equivalent".

Though the mandates given to the two systems were different, state policy expected the same internal structure in both systems. This created some peculiar problems. For instance, a particular Fachhochschule could be an amalgam of two or three well-established schools. Such a Fachhochschule took time to grow out of the strong individual identities of its constituents and develop its own identity. Another example has to do with relations with the State. The former schools were used to seeing the State as a supervisory authority; viewing the State as a supporting structure required many Fachhochschule institutions to reorient their thinking about the way educational institutions had to relate to the State. A third example has to do with the change in pedagogy as a result of moving towards the internal structure of a university. In the new structure students had to take more personal responsibility for learning, and this is cited as one reason for the high dropout rates in the early years of the Fachhochschule system. Yet another transition problem was the amalgamation of the 'teachers' of the old schools and colleges into the 'professorial' structure implied by the university system's structure. The latter prescribed very strict qualifications, which some of the former teachers did not have. Over time, the conditions for fresh faculty appointments (outstanding doctorate and practical professional experience of at least five years) have changed the profile of the faculty towards higher qualifications and experiences. However, problems with respect to placing professors within their salary grade (called Salary Grade C, which has four levels, with the

highest corresponding with the Chair positions), have persisted. Following the practice in the university system, Fachhochschule institutions have also come to rely on a large number of contract teachers. The difference in the case of the Fachhochschule institutions is that such teachers have to be professionals, and so they bring their practical experience to their classrooms. Regardless of these transition problems, the practice-oriented mission of the Fachhochschule institutions, and the simultaneous movement towards a university structure ("different, but equivalent" systems), are best captured in the designation of Fachhochschule institutions as Universities of Applied Sciences.

Entry into the Fachhochschule System

In order to understand the entry of school graduates into the Fachhochschule system, it is essential to appreciate the streaming that takes place at various stages of the schooling level. The German primary school stage (Grundschulen) covers ages six to ten, and does not differentiate among pupils. At this stage (that is, after grade 4), children can enter one of the following streams:

(a) Hauptschulen (Secondary General Schools), for ages 11 to 14, extendable up to 16, if additional training is opted for.

(b) Realschulen/ Mittelschulen/ Sekundarschulen/ Regelschulen: a system of Intermediate Secondary Schools, entry to which depends on success in an entrance exam. Students leave this system at age 16 with a 'Mittlerer Reife' qualification, equivalent to grade 10.

(c) Gymnasien, the grammar schools, which teach up to grade 10. This is the most predominant stream.

At the next stage (ages 16-19) the following can happen:

(a) Hauptschulen graduates can enter vocational schools or opt for part vocational and part in-company training, so as to enter the world of work.

(b) The Intermediate Secondary School graduates can enter full-time vocational schools, or the Fachoberschulen (which is of direct relevance for the Fachhochschule system). A small number also enter Specialized Grammar Schools called Fachgymnasien. The Fachoberschulen provide the "Fachabitur" which allows entry into the Fachhochschule system (and to certain restricted university training courses). A variant is the "Berufsoberschulen", where two languages are taught, leading to an "Abitur" qualification. Graduates of the Fachoberschulen and the Berufsoberschulen can only enter the Fachhochschule system (Universities of Applied Sciences). But if they achieve good grades in their Vordiplom (an intermediate exam in the Fachhochschule system) they can switch from the Fachhochschule system to the university system

(c) The Gymnasien graduates enter the Gymnasien higher secondary system, and leave with the "Abitur", which alone is recognized for entry into universities. Abitur graduates, however, have the option of entering the Fachhochschule system as well. In general, students with the "Abitur" are better in languages than those with "Fachabitur". A variant is the Fachgymnasien schools, whose graduates are eligible to enter the university system.

Thus, the Fachhochschule system draws its intake from the Fachoberschulen graduates as well as Abitur holders from the Gymnasien school system. These entrants are aged 19. As stated above, the Gymnasien stream is predominant. As of the late 1990s, about 75 percent of the high school leavers left with eligibility to enter a university; the rest left with Fachhochschule entry eligibility. Of the 75% with Abitur, about 60% enter the university system, 20% enter the Fachhochschule system and the other 20% entered work/training. Of the 25% who were eligible for Fachhochschule entry, about 60% continued into the Fachhochschule system and the remaining 40% entered work/training. The table below presents an approximate distribution of the destinations of school leavers.

Table 1: Destinations of School leavers (%)

Type of school graduates and destinations	%
Abitur holders who enter universities	45
Abitur holders who enter the Fachhochschule system	15
Fachoberschulen graduates who enter the Fachhochschule system	15
Abitur holders who enter work/training	15
Fachoberschulen graduates who enter work/training	10
Total	100

Note: This table presents only approximate figures since the purpose is solely to enhance understanding. It is based on information collected from University of Applied Sciences, Landshut and University of Applied Sciences, Weihenstephan *and Fachhochschule Institutions in Germany*.

Within a particular Fachhochschule, students can get admitted directly to courses which are "unrestricted", or they can be admitted to courses where local restrictions apply, in which school achievements and the waiting period for gaining entry to that course are taken into account. The Zentrale Vergabestelle für Studienplätze, a national agency, used to regulate the distribution of students in universities and Fachhochschule institutions within Germany for courses with national restrictions, but its work is nowadays confined only to the traditional universities.

Size of the Fachhochschule System

The university system has 113 institutions. On an average, each institution has about 13000 students. In contrast, the Fachhochschule system consists of 177 institutions, but with an average per institution strength of only about 2300 students. The Fachhochschule institutions account for about 400,000 of the roughly 1.9 million students in higher education (about 21%), but as indicated above, the proportion of students opting for Fachhochschulen (on an annual basis) for the first year of their higher education, is reported to be rising. Out of the 177 Fachhochschule institutions, 32 are specialized Civil Service Fachhochschule institutions; there are 145 general Fachhochschule institutions. Only three of the general Fachhochschule institutions have more than 10,000 students; many (71) have less than 2000. In contrast to the relatively limited geographical spread of the university system, Fachhochschule institutions are to be found all over the country and even in some remote areas. The

Fachhochschule institutions can also vary by ownership. Though most are state maintained, there are 19 church-maintained Fachhochschule institutions (12 Protestant and seven Catholic), and 24 privately maintained Fachhochschule institutions. The church-maintained institutions, on account of their tradition, have specialized in social work and social service education. As a result, they account for a disproportionately high 40% of the intake into this particular branch of Fachhochschule education. The growth in the privately maintained institutions (which support themselves through fees, industry sponsors and some state subsidy) is a recent phenomenon. For a long time there were only ten private Fachhochschule institutions, but in recent years, the number of private institutions has grown sharply.

In Bavaria province, there are 18 state-maintained Universities of Applied Sciences, three church-maintained Fachhochschule institutions and one private institution. The University of Applied Sciences, Landshut and the University of Applied Sciences, Weihenstephan are both state-maintained institutions. The rest of this paper illustrates some of the academic and education management issues related to the Fachhochschule system that the experiences of these two institutions illustrate.

Organization of Curriculum

The mission of the University of Applied Sciences of providing a practice-oriented academic training so as to develop in their graduates problem-solving competencies is reflected in the importance given to practical study semesters and the diploma dissertation semester which integrates practical and theoretical learning. The curriculum is spread over eight semesters (four years), but usually graduates spend about four and a half years in the Fachhochschule on an average. The structuring of the curriculum is as follows:

Table 2: Structure of Curriculum

Semester	Item
1	Basic study
2	
3	
4 first half	
4 second half	Pre-Diplom Examination
5	Practical Semester
6	Main study
7	
8	Diplom Examination, practical Diplom dissertation

Note: Where there is an international exchange program, the third semester may be treated as the practical semester, and the sixth semester is set aside for study at the foreign partner institution. The Winter Semester is from October 1 to January 30, followed by exams until February 15. The Summer Semester begins on March 15 and ends on June 30, followed by exams. At Weihenstephan, in the Agricultural Marketing program, the seventh semester is the practice semester, carried out in a company or on a farm.

Over time, both the universities at Landshut and Weihenstephan have expanded their course offerings. The University of Applied Sciences, Landshut offers courses in Business Administration, European Business Administration, Electrical

Engineering, Mechanical Engineering, Industrial Engineering and Management, Informatics, Systems Engineering and Social Work. In addition, it offers a Master's Degree in Industrial Marketing, for which fees are charged. The University of Applied Sciences, Weihenstephan offers courses in Agriculture, Agricultural Marketing and Management, Horticulture, Landscape Architecture, Landscaping and Management, Food processing Technology, Forestry, Bio-informatics, and Biotechnology. (A separate campus at Triesdorf offers courses in Agriculture, Food and Supply Management, and Environmental Conservation.) At Weihenstephan, the Bio-informatics program is an example of a very new discipline that has been introduced since future demand is expected to be high. Landshut's European Business Administration and Social Work initiatives are also innovations in curriculum offerings.

A new curriculum initiative is the course in Social Work at Landshut, which had 24 students as of 2002-03. The Social Work education curriculum in Germany has a long history, with pioneers like Alice Salomon and Max Weber being involved in the curriculum development and training of teachers. The first one-year course in welfare care was offered in 1899. This stream is also one of the most popular in the Fachhochschule system and accounts for about 50,000 of the total Fachhochschulen enrolment. In recent years, the demand for social work graduates among international social work agencies has been going up very rapidly. Such institutions now constitute the biggest market, and they demand extremely well trained managers to deal with a range of community and socio-economic development projects. A related trend is the growing demand for health care professionals. In the early 1990s, the rapid turnover of nurses provoked a debate on the reorientation of the curriculum of the caring professions. Nursing and nursing management was introduced as an integrated offering in 1992 in the Fachhochschule system.

The role of the church-maintained Fachhochschule institutions is very strong in social work related streams. The University of Applied Sciences, Landshut, though state-maintained, cooperates with the three church-maintained Fachhochschule institutions in Bavaria in running this program and in exchange of information. This form of inter-institutional cooperation is new to the University of Applied Sciences, Landshut, but it is reported to have been a smooth and productive experience.

Student Issues

In Bavaria, Fachhochschulen account for about 33% of the student places at present. The plan is to increase this number to 40%. The problem of financing further expansion has, however, been of concern of late. One feature reported to be attracting more and more students to the Fachhochschulen is the clear-cut structure of the curriculum. Students are able to orient themselves to the structure from the very beginning of their studies, and are able to plan accordingly. This situation is different from that obtaining in traditional universities, where the time taken to complete a course of study is longer and cannot be predicted with accuracy by many students.

With more number of Abitur holders entering the system, the quality of the intake has started to show more variation. There is also a lot of variation among Abiturs from the same region, across years. This variation is related to the subjects

chosen as majors—for example, mathematics, physics and biology, or some other combination. Language skills vary too. Fachhochschule Landshut has tried to address this problem through fairly intensive orientation courses at the beginning of the four-year term.

Student drop out is another problem that the Fachhochschule system has been grappling with. At Weihenstephan, about 40% of the registered students leave at the first exam stage or before that. About five percent complete on time, 30% finish by the ninth semester, and about 25% finish by the tenth semester. On an average, within the Fachhochschule system, students who do complete their programs, take about four and a half years. Given the high drop out rates, the issue of efficiency becomes important.

Faculty Issues

Professorial appointments are carried out through formal and well-established procedures. Positions for professors are announced in leading newspapers such as *Die Zeit*. Applicants should have undergone basic training at a university (for four years at least), should have five years professional practice, and should hold a doctorate from a university. A special commission of the University selects three candidates for each position, and ranks them. Finally, the Senate of the University and its President, and the provincial Minister of Science, take the decision. Professors have tenure.

In Bavaria, the publications of each Professor, in German and English, are evaluated. This evaluation is based on a University Law enacted in 1998. Students have been evaluating professors' teaching since 1980.

At Landshut and Weihenstephan, as in other Fachhochschule institutions, Professors have to put in 18 hours per week of teaching. This is perceived to be too high. Professors in traditional universities have half this load, but undertake research as well. The President has no teaching duties. A Dean has half the teaching load. At Weihenstephan, those professors who also shoulder managerial responsibilities (in the research stations) have a reduction of load to nine hours per week. On an average, each professor has about 35 students. In addition to the 67 Professors permanently teaching and researching at Landshut, the University relies on guest lecturers. It hopes that guest lecturers who are in relatively high positions will see teaching at the University of Applied Sciences as an honor. As of now, it is not easy to attract good guest lecturers at the current remuneration levels of 36 Euros per hour (if the person is university trained) and 24 Euros per hour (if the person is a graduate of a Fachhochschule). The reliance on guest lecturers or contract lecturers may continue since attracting good people to the teaching profession, and the creation of new posts, are becoming difficult. In terms of salaries, universities are unable to compete with industry. Within the C Grade mentioned earlier, professors at the Universities of Applied Sciences are in C2 (about 40%) and C3 (about 60%). The highest category C4 is basically only for those professors who have chairs at the traditional universities. Within each category professors are paid according to their 'Dienstalter' (the number of years of service). Young professors, who are about 32 to 35 years when they begin their careers, usually start at C2. Getting promoted to C3, however, is not easy. The C3 position has to fall vacant or has to be created. Strictly speaking

there is no possibility for 'promoting' a professor. According to the rules, anyone whether he or she works outside the Fachhochschule or within, can apply. In practice, decisions about the 'promotion' have been relatively easy and smooth. Along with the application, points awarded for various academic activities (like taking part in Commissions, acting as Dean, contributing to faculty development) determine whether an internal professor will get promoted. Sometimes, outsiders who are very well known in their practice or for their doctoral work can be directly appointed.

Cooperation with External Institutions

While Fachhochschule institutions and universities sometimes offer the same programs, Fachhochschule graduates have come to be identified by their practice-oriented training. Sometimes, students of the Fachhochschule as well as the Technical University of Munich at Weihenstephan could attend courses of either system, if they wanted to do so. For example, horse breeding is a subject taught at the Fachhochschule Weihenstephan, and attended by students from the University of Technology Munich. Cooperation with the universities, however, does not appear to be a feature of the work of Fachhochschule institutions. But one notable recent example is the cooperation of the Fachhochschule Weihenstephan (Faculty of Agriculture) with the "Landesanstalt für Landwirtschaft" (Central Institute for Agriculture in Bavaria) and CARMEN (a company operating in the field of renewable resources), and a few university centers, in setting up a new centre for renewable resources at Deggendorf (near Freising). Three professors and seven co-workers are involved in that centre. The plan is to offer, together with the university, a Master's Program. It is also possible that the research institutions of the university could be used by the Fachhochschule. In practice, the Fachhochschule as well as the University are interested in 'Eigenart'—maintaining the special identities of the two organizations, and so while cooperation is seen as possible and desirable, very close linkages do not seem easy to implement.

Internationalization is a new trend that is especially evident in the University of Applied Sciences, Landshut. New contacts with universities in Great Britain, France and USA have been developed. There are a few problems, however. For example, in the United Kingdom (Cambridge) the cooperating university charges fees, while at the University of Applied Sciences, Landshut, no fees are charged. Sometimes the language can be a problem. For the selection of students, three major criteria are essential: language abilities, personality and the number of students who are willing to go on an exchange. The International Office at the University of Applied Sciences, Landshut coordinates the activities. On an average, about 40% of the students are willing to go and study in foreign countries. They can select the technical courses themselves on the basis of information given by the partner institutions. Students are supported by national exchange support programs and those of the European Union (Erasmus, Leonardo).

Language education is a crucial part of the internationalization effort. It is done through projects. Students make presentations on the basis of their observations in practice. The teachers can select the teaching content. The language department at

Landshut offers six languages. Additional languages may be offered in the future, in cooperation with other universities.

Institutional Issues

There is a growing acceptance of the four-year curriculum of the Fachhochschule system within Germany. One important reason is that companies cooperate with the Fachhochschulen on certain projects, which introduce students to practice-oriented problem solving. Examples are Siemens, BMW and other well-known companies. At the same time, many graduates are getting into the second highest level of government employment ("Gehobenen Dienst"). The economy drive has meant that many jobs at the "Höhere Dienst" (the highest level, into which graduates from the universities used to go) have been cancelled. Fachhochschule graduates are therefore at an advantage. In spite of the acceptance of and need for the Fachhochschule system, shortage of funds has been a major concern in policy circles. There is also a perception in these circles that it may be cheaper to produce Fachhochschule graduates than traditional university graduates. In Bavaria at least, there is a firm belief in the competitiveness and future potential of the Fachhochschule system. Though the number of students dropping out continues to be fairly high, it is lower than the number dropping out of the university system. The Fachhochschule system also has an advantage in that 'tutoring' is more intensive than in universities. Another advantage is the system of evaluation of students, which is more transparent in the Fachhochschule system. This system allows for particular students to be selected for additional tutoring.

Continuing education is seen as a task to be performed by higher education institutions. The Fachhochschule system is, however, constrained in this respect, since the load on professors is perceived to be already high. Also, such activities are funded by the Ministry, the Federal Government and the European Union, through specific projects, which Fachhochschule institutions may not be in a position to undertake institutionally. Universities are definitely better equipped. A high need for laboratory equipment, which is expensive, means that Fachhochschule infrastructure updating is a costly activity.

A Final Note

We began by explaining in the preface our rationale for examining alternative models of education which attempted to integrate application-oriented education with a socially-relevant educational purpose. The Fachhochschule system's experience, while unique to Germany, in many respects mirrors efforts carried out elsewhere in the world to develop a 'relevance' dimension to an educational purpose by responding to society's needs. It reflects a concern for producing an adequate number of well-qualified technical people, and illustrates the evolution of a narrowly-defined 'vocational education with qualification' system into one which produces graduates who have been educated, rather than trained, through a combination of theory and practice. The strong presence of the caring professions (including social work) and significant emerging global issues like renewable energy in the Fachhochschule system offers the potential to redefine the values underpinning the system towards a

greater focus on concern for others, the environment and sustainability of human development. No doubt the Fachhochschule system is subject to the same pressures that institutions in the developing world face—financial constraints, high levels of student drop-out, demands to improve the quality of the education offered in spite of a financial crunch, "doing more with less", and attracting and retaining qualified staff. In addition, the Fachhochschule system has had to deal with the problems of transition: learning to deal with the state as a "supporter" rather than as an unconditional provider of resources, internationalization from a predominantly internal focus, establishing institute-industry linkages to cope with more students, less emphasis on research, and in relation to the university system education, maintaining its own "different but equivalent" characterization. These positives and negatives, from the perspective of collaboration among similarly placed Fachhochschule institutions, indicate the need to develop appropriate institutional development practices within the framework of a strategic, long-term response aimed at improving the quality of services and ensuring institutional/ systemic sustainability. Kalro (1999), while pointing out that it is at the individual institutional level that external pressures are received and interpreted, identifies six key factors that should frame any response: responsiveness to the 'market'; identification of a niche and the development of competence in that area; generation of resources through marketing of the institution's products or through the goodwill the institution has generated; recruitment and retention of competent "people who make it happen"; leadership which fosters innovation; and finally, attention to certain internal institutional processes. The final factor can be further broken down into: autonomy tempered by accountability, involving internal staff in the governance of the institution, group decision making, checks and balances, and self-renewal (Kalro 1999: 36-45). These point towards the culture that is desirable in an institution, especially of the Fachhochschule kind, which has to produce qualified technical personnel within the minimum period time possible, has to be constantly searching for "learning through work" openings in the industrial sector, and is attracting an increasing number of graduates from the Gymnasien school system.

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Part 3

Interdisciplinary Studies on National Parks, Ecotourism and Investment

Jan W. Dobrowolski*

An Interdisciplinary Study of, and Education for, the Sustainable Development of National Park Regions in Poland and a New Concept of Sound Tourism Management applied to the Cinque Terre National Park in Italy

Keywords: Interdisciplinary research, problem-solving training, Sustainable Development of protected regions, education for Sound Tourism

Abstract: The activities described here, in the context of the Smart History Project, were undertaken against the background of recommendations by the UN, UNESCO and the European Union regarding education for Sustainable Development (Dobrowolski, 2005 a, b). They include the extension, at our suggestion, to Italy's Cinque Terre National Park (henceforth Cinque Terre) of modern technical methods applied to interdisciplinary studies tested in protected regions as well as training for solving similar problems in Poland. The aim was to assess the scope for promoting Sound Tourism in the Cinque Terre as a model activity for national parks in Europe. The attractiveness of the food products of this region is very high because of the fact that these products are pollutant free. Therefore it is very useful for the future to use cheap methods of screening / monitoring some environmental pollutants to ensure clean air in the vicinity of local vineyards. Another innovative method we would like to introduce is the application of laser photostimulation of cuttings and seedlings of plants for solving such problems as: (1) the accelerated reintroduction of vineyards in the upper parts of terraces, which had been destroyed by forests; (2) the accelerated formation of green areas alongside the roads (to limit the dissemination of side effects of traffic); (3) the more effective use of some water plants in hydrobotanical wastewater treatment stations (Dobrowolski, 2001). This would constitute a contribution to the protection of cultured landscape, ecosystems and the health of consumers. The innovative methods recommended above can facilitate the promotion of Sound Tourism and Sustainable Development of the Cinque Terre by applying innovative biotechnology supportive of Sustainable Development and by increasing the motivation of tourists to plan sightseeing of the mountainous part of the Park, prompted by the beauty of the landscape and the old architecture to be found in the upper parts of the mountains. Methodological experience of case studies and problem-solving training in the model areas will be useful for the proper management of other protected regions and the conservation of similar anthropogenic sites in Europe.

* Jan W. Dobrowolski, Department of Environmental Biotechnology and Ecology, Wydz. GGiIS AGH, AGH Open University, Sci. Council of the Goetel School of Environmental Protection and Engineering, 30-059 Krakow, Mickiewicza 30, Paw.D-11, Poland, email: dobrowol@agh.edu.pl

Background Information

The dissemination of good practice relating to the integration of problem-solving training into the education of local inhabitants and visitors in order to generate common action promoting Sound Tourism and Sustainable Development seems to be a *conditio sine qua non* for the effective protection of regions of top quality natural and cultural heritage, as well as for the provision of new job opportunities for the younger generation. The model area for the international exchange of experience useful in this field was Cinque Terre. The corresponding European Smart History Project was finished in May 2005.

Drawing upon the local knowledge of local stakeholders, experts from the staff of the Park and the representatives of cooperating universities and other institutions, the main problems of Cinque Terre N.P. were perceived to be tourist overflow and the transformation of the economy. At the beginning of the Cinque Terre international workshop, our team presented a review of specialized scientific and technical activities and relevant experiencs from similar areas in Poland, which were expected to prove useful in solving some practical problems in the area of Cinque Terre (Dobrowolski, 2005, Report of the Polish Team within the Smart History Project presented at the Session in Riomaggiore in May 2005). Following study visits and consultative meetings during the Workshop, scholars and university students took an active part in the elaboration of user- and market-oriented proposals generated by the working groups and teams. The database comprising experience from the Cinque Terre Workshop and similar experience of long-term case studies and training in some Polish national parks facilitated the making of proposals intended for consultation with stakeholders, practitioners from the National Park as well as scientists and university students from other countries.

Education for Sustainable Development and the promotion of information about the old architectural and ecological values of Cinque Terre on an international scale (using adequate socio-technological methods and new tools of communication e.g. by Internet) were considered prerequisites for the ultimate selection / identification of visitors willing to cooperate with the local community and focused on the conservation of the cultural landscape for the benefit of present and future generations.

Permanent education in this field (including distance education, especially e-learning) for all age and professional groups is necessary. Practically oriented education from the very beginning is especially important. A good example is ecologically oriented education of small children at the primary school in Riomaggiore, having a real interest in the protection of the beauty and natural values of their small homeland. The joint education, at the same age, of local schoolchildren and groups of children from other regions seems to be very useful. The development of training for young people from high schools, university undergraduate and postgraduate courses was proposed in addition to training in the integrated management of national parks and surrounding regions. The Cinque Terre is recognized as a good example to follow, integrating as it did all local stakeholders for the promotion of Sound Tourism and Sustainable Development.

The education of society as a whole should be supplemented by the professional training of managers of similar national parks from different countries and staff assigned to the promotion of Sound Tourism, as well as university students and graduates of environmental engineering and protection, agriculture, forestry, landscape architecture, etc. Such education and training activities (including postgraduate courses) would be the way to extend qualified tourism beyond the present tourist season. In Poland, we have had good experience with postgraduate courses of Sustainable Development for managers of national parks and health resorts.

Simultaneously, it is necessary to fight poverty by developing Sound Tourism, based on education and making young people sensitive to the cultural and natural heritage, as well as environmental health. Modern software and hardware for large-scale communication offers a real chance to disseminate this knowledge and good practice. The Rector of AGH, Prof. R. Tadeusiewicz, and other experts in computer science give a series of highly appreciated lectures in this field every year at the AGH Open University in Krakow, Poland. A valuable spin-off from progress in the automatic understanding of image analysis and artifical intelligence lies in the early detection of environmental risk factors for human health, including negative effects of pollution of the natural environment in the national parks and health resorts (Tadeusiewicz, Dobrowolski, 2004). This relationship is a crucial problem in the modern protection of landscape and water management (Wicherek, 2000).

Environmental Impact Assessment (EIA) is to be recommended as a reference system for the proper management of tourism in areas of national parks, including the distribution and ‘density’ of tourists.

Modern systems of distance communication and the guide network from the harbours, car parks and railway stations to the top of the mountains (including selected points of special interest for tourists) would be very helpful for solving this important problem. Technical infrastructure (described by the experts in informatics and communication from Poland and Italy participating in the Project Smart History) would be more useful, if decision-makers and experts were to introduce a proper strategy promoting Sound Tourism and Sustainable Development in the model area of the Park.

The question may be asked: what kind of tourists does the park authority want to attract? A complementary question is similar: What type of services and products do the local stakeholders want to offer the visitors and how should these products be promoted? Of quite basic importance is the task of aligning the expectations of local communities and those of selected tourists regarding the revitalisation of the economy of Cinque Terre by proper flows of cultural tourism in the mountainous part of the Park, as well as encouraging young people to live in this region. Development of modern infrastructure for mass tourism (including a system of environmental protection and communication) will be a crucial contribution to giving new job opportunities in this area to graduates of different schools and promoting study fields.

Psychological and sociological studies about the expectations of different groups of potential visitors to Cinque Terre would be very useful in placing them in a position to respond positively to the stimulation provided by the Internet and other

tools of long-distance communication in co-operation with the network of schools and universities. Technical progress in communications (Button et al., 2005, Kobayashi, Laksman, Anderson, 2005) helps to promote education focused on Sound Tourism. In this context an interdisciplinary case study on Internet use by university students and the model of knowledge-based society initiated by Tadeusiewicz at the Can AGH University of Science and Technology in Poland offer a useful basis for common action on Sustainable Development (Tadeusiewicz, manuscript in German ready for publication in 2005) and these can be usefully applied also to Eco-Tourism (Ukeda, Maser, 2003).

There are some examples of good practice in the integration of different kinds of organized tourism in similar regions in Europe by promoting guided excursions focused on education about nature and culture and promoting healthy physical activity as well. The most famous organizer and tutor of such excursions for young people was Karol Wojtyła, who, as a young priest, subsequently bishop, organised numerous trips to the mountains for students. As Pope John Paul II, he strongly supported ecologically oriented NGO movements on a global scale. He was also active in pilgrimage tourism to sanctuaries, including the World Culture Heritage site in the mountain area of Kalwaria Zebrzydowska (Southern Poland). Therefore, we propose to name a new, model pathway promoting Sound Tourism among sanctuaries in the Cinque Terre National Park after Giovanni Paolo II (John Paul II). He is commonly recognised as the greatest moral authority all over the world and a good example of people-oriented living conditions especially among the younger generation. The Pope died in April 2005 . When he was Cardinal in Krakow, he was committed to long-term eco-tourism and the protection of our natural and cultural heritage.

Specific problems for the Cinque Terre National Park

Among specific problems facing the Cinque Terre National Park is the maintenance of terraces and the motivation of tourists staying predominantly in the coastal area to go on food excursions up the mountains.

The proper management of vineyards and terraces is impossible without the successful motivation of young people get involved in this hard work. Love of local tradition and a deep interest in close contact with nature are conducive to motivating properly educated people. At the same time, it is necessary to promote local traditions and cultural diversity as a necessary condition for the successful protection of biodiversity including anthropogenic landscapes in mountain regions like 5 Terre, and these characteristics make it a good area for model activity. Simultaneously, it is necessary to fight poverty by developing Sound Tourism, based on education designed to make young people sensitive to their cultural and natural heritage as well as the health of the environment. Modern software and hardware for large-scale communication provide an effective means of disseminating this knowledge and good practice.

This kind of activity could also stimulate the development of Agro-Tourism with a proper technical infrastructure for cleaning wastewater and for waste management using ecologically friendly biotechnology.

High quality photogrammetric documentation (such as that produced by experts from the Department of Photogrammetry and Remote Sensing, Faculty of Geodesy and Environmental Engineering, AGH University of Science and Technology), which shows the beauty of the Cinque Terre landscape and the old churches in the mountains, seems to be an important element for the promotion of Sound Tourism (see: www. cinqueterre. parconazionale. it).

Referring to the problem of too big a concentration of visitors in the coastal region of Cinque Terre, we propose exhibiting large-scale photographs at the railway stations, in tourist information centres and along the most popular paths like Via dell'Amore. These would show the beauty of the old architecture and landscape as seen from the upper part of the Park. They could motivate tourists to go up the mountains, especially using the new paths linking points of interest among sanctuaries. Experts participating in the Smart History Project elaborated methodological guidelines for the implementation of Sound Tourism in Cinque Terre and similar regions benefiting from photogrammetric and remote sensing documentation. Good use can also be made of a GIS database as well as modern systems of communication and information for tourists engaged in sightseeing and also a database of tourism and national parks management.

Supplementary activities would be connected to the promotion of cultural projects attractive both to local inhabitants and visitors, as a contribution to the human dimension of Sustainable Development. One proposal is to have regional, national and international festivals or competitions featuring folk music and dances from different mountain and coastal regions. These could be held, for example, in the castle in Riomaggiore and other old buildings suitable for such activities. Such assemblies and festivals are popular in Poland, especially in the mountain regions (including youth and student assemblies at universities). Another way of presenting cultural programs may be concerts by well-known choirs singing religious music or classical chamber music in churches and sanctuaries, as well as poetry and song recitals expressing the beauty of nature and the culture of different regions. One might also suggest recitals of poems written in the region of Cinque Terre, in particular Poets Bay.

A novel way to motivate visits to the mountain district of the Park would take the form of religious pilgrimages, which are very popular in some European countries, especially new members of the EU like Poland and Slovakia. Another activity - very common in the mountain national parks e.g. in the Carpathian Euro-region - is guided walking , bicycle, horse and water tourism, as well as different kinds of physical activity organised by sports clubs in clean areas in close contact with nature. The managers of Cinque Terre are already emphasising the attractions of tourism close to nature.

Experience with Methodology and Recommendations Useful for the Future

Involvement with case studies carried out over a period of 38 years in the model areas of Poland has equipped the Polish team with comprehensive experience of the methodologies appropriate to interdisciplinary study and training and educational programmes aimed at problem solving. The emphasis here is on joint action

involving, on the one hand, professors, young scholars, doctoral students, and lower-level students and, on the other hand, local stakeholders, managers of national parks etc. These joint actions serve the promotion of Sustainable Development of National Park regions and the more effective protection of ecosystems and natural and cultural heritage as well as human health.

Following Goetel's initiative, three generations have played a creative role in the development of interdisciplinary research and training focused on solving real problems in different regions in Poland, including areas of top quality natural and cultural heritage like the Pieniny Mountains National Park, the first border park in Europe and small parks near big industrial centres, such as the Ojców National Park. As a result of the cooperation of experts, students and local inhabitants concepts were elaborated that proved to be of practical use. Mention may be made here of the fact that in the region of Ojców a new road outside the National Park was constructed for the more effective protection of the cultural landscape, ecosystems and human health. Goetel started over 40 years ago with seminars open to all, which focused on common action for the sustainable management of natural resources and protection of the human environment to benefit future generations. In 1956, the General Assembly of the IUCN adopted his proposal for international and interdisciplinary co-operation focused on the protection of both natural and cultural resources for the benefit of future generations, adhering to the democratic rule of partnership.

There are some interesting recommendations in the Seville Strategy of Man and the Biosphere (MAB) Programme, as well as in UNESCO discourses on environmental education as one of the pillars of Sustainable Development.

Interesting implications follow for the Cinque Terre project in Italy, which are linked to promoting conservation and the sustainable use of biodiversity through the development of Sound Tourism in Central and Eastern Europe, e.g. in the Babia Góra Biosphere Reserve in Poland, Slovensky Kras in Slovakia and Aggtelek in Hungary. This project is focused on capacity building and raising the awareness of local populations and administrations. These regions represent test areas of the International Tourism Guidelines of the Convention on Biological Biodiversity (CBD) in co-operation with UNESCO. The goal of these activities is the improvement of interdisciplinary research integrated with problem-solving training and the co-operative education of local stakeholders and managers involved in common action with experts promoting Sound Tourism and Sustainable Development in Cinque Terre as a good example to similar national parks in Europe.

Very useful would be a permanent exchange of experience related to the promotion of eco-tourism and education about biodiversity and local ecosystems in some protected areas like Cinque Terre and recommended by the Seville Strategy applied to UNESCO's Man and the Biosphere Programme. To be considered from this perspective are such mountain park projects as the East Carpathian Biosphere Reserve (including the Bieszczady Mts. border park), Tatras Biosphere Reserve, Karkonosze Biosphere Reserve, or Vosges du Nord/Pfalzerwald Biosphere Reserve. To be especially recommended may be a comparison of methods of local community participation (including school youth) in promoting Sustainable Development in regions such as Cinque Terre and the Grosses Walsertal Biosphere Reserve in

Austria. A pilot project involving the Council of Europe and MAB is in progress in collaboration with Ecological Tourism in Europe. We would also recommend the application of experience related to the sustainable use of biodiversity and the promotion of Ecological Tourism in Central and Eastern Europe in the following Biosphere Reserves : Sumava in the Czech Republic, the Babia Gora in Poland, Aggtelek in Hungary and Slovensky Kras in Slovakia. One should include here educational itineraries for students interested in our natural heritage. Similar information set out, for example, on large tables with photographs and explanations in 3 languages would be useful for promoting the local cultural heritage and landscape conservation. I could also recommend as good practice the Tourist Information Centre in the French-Spanish Park in the High Pyrenees, which promotes, among other things, complex information about geological, geographical, biological, ethnographical and other aspects of the region, including the presentation of short films about rare species of birds. Also worthy of attention are initiatives of some other Tourist Information Centres in Polish National Parks such as the Pieniny Miuntains and the Ojcow National Park, which offer review films about the natural and cultural heritage of these Parks. There are some similarities between the latter Parks and Cinque Terre, which throw light on the anthropogenic origin of cultural landscapes and the promotion of education for Sound Tourism. An exchange of programmes and training course methods among European parks for students interested in this field would be useful for all. Valuable experience has been gathered in the educational field in some protected areas in Poland (spanning ca. 40 years) and from long-term activities in Switerland, France (inter-university summer schools for French students in Port Cross), Spain (international courses for university youth leaders in Eco-Tourism in Coto Donana), as well as from related study visits of foreign scholars and university students in selected European countries (Austria, Poland, Czech Republic, Italy, Germany, Great Britain, Swizerland including the WWF headquarters, France. The same is true of the Ministry of the Environment in Sweden and the Aso National Park and local Centre of Natural and Cultural Tourism in Japan.

Education in this field seems to promise even greater benefits in the future, given that Eco-Tourism was reported to be the most dynamic sector of the tourism industry on an international scale (Honey , Rome, 2002, Huybers, Bonnett, 2002).

A particularly interesting educational project including 'Biosphere Classes' has resulted from the partnership of the French national education sector and the MAB-UNESCO partnership for the Pays de Fontainebleau Biosphere Reserve, involving the European Institute for Sustainable Development. This activity is based on the integration of natural and cultural aspects, including cultural and artistic excursions, as a way of raising youth awareness of the cultural landscape against an historical background (see: www.biosphere-fontainebleau-iedd.org). We also propose to include related experience in a special Database and Network of European Co-operation of National Parks and other institutions (including universities) interested in the exchange of experiences and in developing cooperation on Education for Sustainable Development in Regions of High Culture and Nature Heritage like Cinque Terre. Included here are comparative case studies and interdisciplinary

research, problem-solving training for students and graduates and education for local stakeholders and visitors committed to Sound Tourism. The development of integrated activities seems to be the key to more effective protection of certain common treasure of Europe – biodiversity and cultural diversity. Included here are both environmental and biological monitoring, as well as the monitoring of socio-economic and socio-cultural aspects of Sound Tourism in National Regions such as we started in Poland in 1970. Material generated by the Quebec Summit on Eco-Tourism in 2002 provides a useful background in this context (WTO 2003, UNEP, Paris, 2003. Experience arising from, and the network of links resulting from, the Global Biodiversity Information Facility (GBIF) and the establishment of the GBIF-UNESCO Chair in Biodiversity Informatics in Tsukuba at the end of 2003 may also be useful in the context of activities designed to promote the protection of cultural heritage and the cultural landscape in the case of National Park regions such as Cinque Terre in Italy, the Pieniny Mountains Border Park bounded by Poland and Slovakia, or Ojcow in Poland.

An International Conference sponsored by UNESCO was held in Graz universities at the beginning of the UN's Decade of Education for Sustainable Development sponsored by UNESCO in this field. Experts from European countries and beyond participated and formulated the resulting Declaration on Committing Universities to Sustainable Development. The Conference Proceedings edited by M. Narodoslawsky et al are also of importance. Within the Smart History Project, this volume covers *inter alia* the subject of Tourism and Sustainable Development in the model area of Cinque Terre (Dobrowolski, 2005a). These Proceedings were also background material for the European Conference of Ministers of Education in Bergen in the summer of 2005.

Eco-Tourism, as the most promising sector of the tourism industry in many countries, requires better promotion within contemporary society in order to improve the economic growth of regions with natural and cultural heritage resources (WTO, 2003, Kurek, 2003, Wink, 2005). For certification programmes 'it is necessary to extend theoretical analysis based on neoclassical institutional economic models with the help of the concept of collective learning' in order to facilitate the transparent distribution of this tourism (idem). Eco-Tourism is very closely related to education and the knowledge-based society. What is also necessary is a linkage between this kind of tourism and modern training for both environmental and tourism professionals, based on the common action of experts and managers who want to see this kind of alternative tourism and the promotion of Sustainable Development of protected regions brought together. The knowledge-based society opens a new perspective of more active contributions made jointly by all partners for the effective conservation of ecosystems and biodiversity as well as cultural diversity. This is a common responsibility of all those who treasure the well-being of mankind as a whole.

Summary and General Conclusions

The experience resulting from the Smart History Project of the Directorate of Culture and Education of the European Commission was based on interdisciplinary and

international activity. It is very useful for the promotion of education for Sound Tourism and Sustainable Development in regions of National Parks in Europe. This model refers to good practice in the cooperative efforts of stakeholders, local administration and the staff Cinque Terre, complemented by cooperation with professors, young scholars and university students based in the AGH University of Science and Technology in Krakow, Poland, the Technological Universities of Antwerp, Belgium, Belgrade, Yugoslavia, Bratislava, Slovakia, Odessa, Ukraine, and experts from Universities in Florence, Genoa, Turin, with the participation of the International Workshops of the Del Bianco Foundation. The focus of the combined efforts was common action designed to protect our natural and cultural heritage. The particular issue in relation to cultural landscapes was the continued support of traditional economic activities, e.g. the cultivation of vineyards to protect terraces. Combining the application of modern techniques to document the beauty of landscapes and old architecture with the communication facilities offered by the Internet, one would use the Tourist Information Centres to promote Sound Tourism in order to educate both visitors and residents and thereby lead to changes in the spatial structure of tourism, moving tourists from the coastal area up to the hills. This would, for example, require the provision of new paths linking old old sanctuaries. The project also envisaged the extension of the tourist season by offering attractive programs catering for elderly visitors and educational activities for the young generation. To foster a permanent exchange of useful experience, we propose the establishment of a network of National Parks facing similar tasks regarding the cooperation of managers and experts and incorporating the necessary training and educational activities.

The recommendations to develop interdisciplinary studies, problem-solving training and modern methods applicable to the Smart History Project were based on Polish experience in this field. In formulating an agenda of practical applicability to promote the Sustainable Development of Cinque Terre, our team broke some new ground. We tested the possibility of using samplers to control the level of air quality, monitoring indicators of the level of traffic output and pollutants contributing to acidification. The team had the advantage of substantial experience in the application of this kind of monitoring in order to formulate recommendations for pollutant-free regions, for the production of pollutant-free food, for healthy recreation and the protection of our natural and cultural heritage. We also tested the prospects for applying innovative laser biotechnology for more effective protection of the natural environment (terrestrial and aquatic ecosystems). The Polish team proposed a new interdisciplinary, international project designed to promote the transfer of good practice from Cinque Terre and of useful methodological experience from other National Parks in Europe to support education towards Sound Tourism and Sustainable Development. The focus here was on ecological culture and the protection of cultural landscapes in different countries. Drawing upon our knowledge of similar problems and our long-term activity in this field, we are convinced that a comparative case study and the education of local inhabitants and tourists to promote their problem-solving skills would be very useful in Poland, as well, where the

Pieniny Mountains, the oldest European border park, and Ojców with its particularly interesting natural and cultural heritage are concerned.

Following consultations with the leader of the Polish Team, the directors of some Polish and Slovakian National Parks and Centres of Old Architecture declared in June 2005 their interest in participating in such a European project in the future. We want to suggest the establishment of an international network of universities, decision-makers (e g. managers of the national parks) and local stakeholders committed to the promotion of education for Sound Tourism in, and Sustainable Development of, the most interesting regions (including both National Parks and historic cities). Modern communication techniques as well as international projects and workshops would be very useful in fostering common action for more effective protection of the foremost cultural and natural heritage in Europe.

Interdisciplinary case studies are necessary for problem-solving education and common action for the promotion of Sound Tourism and the protection of our natural and cultural heritage specifically in Cinque Terre, which functions as a model area for the verification and dissemination of the insights we have gained. Recommendations have emerged regarding new methods of documentation of cultural landscapes and the dissemination of specific knowledge relating to values underlying our approach to nature and culture. In addition, we have proposed the construction of new paths linking sanctuaries and designed to facilitate Sound Tourism in the mountain part of the National Park. We would also like to signpost the way to good practice through social participation in the Sustainable Development of protected regions based on conservation and sustainable use of natural and cultural heritage.

In recommending innovative methods of controlling the condition of the natural and cultural heritage and for more effective protection of the natural environment, we highlighted new methods of environmental monitoring, remote sensing, GIS, photogrammetric studies and environmental biotechnology, bearing in mind that these are related to the more effective protection of biodiversity and ecosystems, of old architecture and of cultural landscapes. This is also important for the education of local inhabitants and visitors, experts and decision-makers and their joint participation in promoting Sustainable Development and the protection of cultural landscapes. For the professional training of staff from different countries, the modern approach of case research seems to be very promising for the future (Ecimovic, Stuhler,Vezjak, 2000, Suhler, Vezjak, 2002).

Methodological experience gained in the context of the Smart History Project would be very useful for solving similar problems and the promotion of common action focused on education, Sound Tourism and Sustainable Development of different national parks famous for their cultural landscapes in Europe.

In the context of the Decade of Education for Sustainable Development, we would like to propose the international training and educational initiatives undertaken in parks like Cinque Terre in Italy, Port Cross in France, Ojców and Pieniny in Poland, etc. The staff of the above mentioned parks are already very active in education aimed at the co-operation of experts, managers, local stakeholders and visitors for the protection of nature and culture heritage. The necessary condition for a successful

conservation of cultural landscapes is keeping alive the traditions of the local economy and the education of residents and visitors with regard to sustainable tourism.

We would also like to give some proposals referring to the possible future of research in national parks, based on research already done in certain national parks in Europe.

Announcement

In the context of the 11th International Conference on Sustainable Development, to be held in Poland in the middle of September 2006, our team will be highlighting the city of Krakow (representative of World Culture Heritage) and the region of the Pieniny Mountains (the oldest border park in Europe) in Poland. The subject of the Conference will be the interdisciplinary co-operation of experts and decision-makers in the promotion of this kind of development and Sound Tourism in historical cities and protected regions (national parks, health resorts, etc.) including interdisciplinary research, problem-solving education for common action of experts, stakeholders, decision-makers, NGOs, etc. More detailed information is available by

E.mail: dobrowol@agh.edu.pl

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Aleksandra Wagner, Jan W. Dobrowolski, Maria Zielińska*

Ecotourism as a Factor of Sustainable Development of Specially Protected Regions**

Abstract: Eco-tourism contributes both to the increase of society's environmental awareness, as well as the clarification of leading trends in sustainable development in areas important from the environmental point of view. For many years, interdisciplinary case studies were carried out in different regions of Poland (national parks in coastal and mountainous areas). The studies were combined with common action involving local communities with regard to particular problems of sustainable development geared to the specifics of a particular protected region. The paper also presents the definitions of eco-tourism, problems of side effects of mass tourism (with particular emphasis on the impact of traffic output on ecosystems and human health). Results of some of the studies on residential and weekend tourism are mentioned. The necessity of the co-operation between experts from different fields and local communities is stressed. Professional and informal education in the problems of sustainable development was supported by practical findings.

1. Introduction

Mass tourism poises a big threat to the natural environment. Usually, the most attractive areas, from the tourist point of view, are national parks and natural reserves. Some of these areas (e.g. the Tatra Mts. in Southern Poland) are overcrowded by tourists, whose numbers exceed the capacity of the area. Many tourists show very low environmental awareness. They show a lack of discipline by making their own paths, using bicycles outside of bicycle paths, leaving rubbish and occasionally collecting plants belonging to the species protected by law.

The study in the Pieniny and Tatra Mountains carried out in 1968-1975 [Dobrowolski 1977] also concentrated on mass pedestrian tourism. It proved the synanthropisation of flora in mountain areas – tourists tended to walk outside of the specified paths, and they would accidentally disseminate the seeds of synanthropic plants to the wild areas with their shoes. Thus it is very important to increase the discipline of tourists both by environmental education and even legal actions. One of the studies presented the analysis of offences against environmental regulations made by tourists and local residents. This study concluded that education programmes should be developed both among residents (especially schoolchildren) and tourists. Such interdisciplinary problem-oriented education and training have been continued for 35 years.

* AGH – University of Science and Technology, 30-059 Kraków, Al. Mickiewicza 30, e-mail: awagner@uci.agh.edu.pl, dobrowol@uci.agh.edu.pl, mziel@uci.agh.edu.pl

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An additional threat is the development of motorized tourism. The effects of pollution caused by traffic can be minimised by proper agro-technical treatment [Curzydło 1994, Dobrowolski 2001]. Other negative effects can be aggravated by the construction of new roads, especially motorways. In Poland, most of the technical solutions (bridges) aiming to facilitate the migration of animals are inadequate, not considering animal behaviour (too narrow for most mammals, there are only provisional solutions for amphibians trying to get to their breeding places) [Curzydło 1997].

Large concentrations of residential tourism are often connected with the lack of proper infrastructure - in particular lack of effective water treatment and proper waste management. The most promising thing would be the application of environmental biotechnology for more effective treatment of wastewater as well as biological methods of utilizing organic waste – compost and biogas production [Dobrowolski 2001].

The similarity of problems connected with the negative influence of mass tourism on the natural environment show the necessity of developing international co-operation. Examples can be study visits in different regions of Western Europe: Switzerland, the northern part of Italy and co-operation in the implementation of modern solutions with non-European regions of the world (e.g. Japan) [Amaya, Tanuma, Dobrowolski, 1990].

2. What is eco-tourism? – Definitions and Criteria

In recent years, eco-tourism has become a very frequently used term. The United Nations designated 2002 as the “International Year of eco-tourism”. Evidence for the popularity of eco-tourism can be the number of Internet sites on this topic. Most searching provides hundreds of thousands of matching sites when the word "ecotourism" is accessed. However, the term “ecotourism” causes a lot of misunderstanding and there are many definitions of eco-tourism (or sustainable tourism – term often used interchangeably). Some of them are given below [after Zaręba 2000]:

1. The International eco-tourism Society (TIES) defines eco-tourism as "responsible travel to natural areas that conserves the environment and sustains the well-being of local people (http://www.ecotourism.org).
2. Concept of tourism, related to natural environment, organised and managed in a sustainable way, containing elements of environmental education and financially contributing to environmental protection. (International Centre for eco-tourism Research)
3. Travel to nature, contributing to its protection (Elizabeth Boo, WWF)

While the details vary, most definitions of eco-tourism boil down to a special form of tourism that meets three criteria (see http://www.planeta.com/ecotravel/tour/definitions.html):

1. it provides for conservation measures;
2. it includes meaningful community participation;

3. it is profitable and can sustain itself.

There are also some terms which are often used interchangeably with eco-tourism. Some of them have broader meaning [Zaręba 2000].

- Alternative Tourism – as opposed to "conventional" mass tourism. Apart from eco-tourism, it can include any forms of "specialised" tourism – focussed, for instance, on sport, art, religion, etc.
- Sustainable Tourism – a form of tourism that can contribute to the sustainable development of the visited region.
- Responsible Tourism – of course any activity, including tourism, should responsible; using this term suggests that most of tourist activities are irresponsible – without respect for local communities and/or the environment.
- Conscientious Tourism – encouraging deeper knowledge of visited places and local people.
- Natural Tourism – often used as a synonym for "ecotourism", focused on visiting places of great natural value. However, it often involves visiting such places without respecting them (e.g. most safari tours in Africa, that can be considered as pseudo-ecotourism).
- Green Tourism – effectively a synonym for eco-tourism.
- Agrotourism – often presented in the context of eco-tourism. It can be a form of eco-tourism; however, not every form of agro-tourism can meet the requirements of eco-tourism.

3. The Significance of eco-tourism in Poland

In most countries, tourism is a very important (actual or potential) source of national income. It gives a chance to less economically developed areas of natural beauty. However, traditional mass tourism creates environmental problems and has to be controlled. Eco-tourism can be a good alternative to non-sustainable mass tourism.

Poland is one of the countries having great opportunities for the development of eco-tourism. In some parts, it preserved primeval forests (the north-east with the Białowieża National Park is the biggest forest area of this kind in Poland). Polish landscape varies from lowlands (northern and central part) through uplands and mountains (southern part). In the northern part of Poland, there is the Baltic coast with sand dunes (e.g. Słowina National Park). Sand dunes are also present in central Poland – e.g. Kampinos National Park – near Warsaw. Most of the northern and central part is covered by lakes, which make habitats for many bird species). Apart from primeval and natural landscapes potentially important for eco-tourism, there are anthropogenic landscapes of traditional countryside – a cultural landscape. The existence of traditional farmhouses provided opportunities for agro-tourism, which can be combined with eco-tourism. As mentioned at the beginning – one of the premises of eco-tourism is the respect for local traditions and local people (conscious tourism). A good example of the combination of natural and anthropogenic landscapes is Ojców National Park – north of Cracow.

Good opportunities for eco-tourism can also be found in urban environments such as urban parks, artificial lakes etc. They can be interesting places to see for amateur naturalists such as birdwatchers. Parks can also be used to enhance the environmental awareness of people. Trees already rare in nature such as the yew-tree (*Taxus baccata*) – first species protected by law in Poland (11th century) - are grown in parks providing a good opportunity to see rare species. Urban green areas can protect the residents of the cities from industrial, traffic and other emissions causing pollution. Especially useful for this purpose are Austrian pine (*Pinus nigra*), yew-tree, willow (*Salix* sp.) and hedges made of holly (*Ilex* sp.) and privet (*Ligustrum vulgare*). They are able to absorb large quantities of pollutants. Some parks, e.g. Jordan's Park in Cracow, also provide opportunities for more active forms of recreation, such as sports – contributing to a better physical development of people.

4. Transport problems in Tourism

Eco-tourism has to pay attention to the means of transport tourists use. "Traditional" tourists usually use cars or buses to get to the place they want to visit. However, more environmentally conscious tourists would agree to situate car parks further away from the places of natural beauty in order not to pollute the natural environment. Studies done in the 1980s by Dobrowolski and co-workers show that the visitors of the Wolin National Park (north-western Poland) would agree to have the car park moved further away from the border of the National Park. At the same time, studies on air pollution were done proving high levels of concentration of pollutants in the area of ferry transport between Wolin and Uznam Islands in the town of Świnoujście.

In some national parks (e.g. the Słowina National Park), electric cars are used. They are however limited to relatively flat areas. Riding on horseback has no such limitations. This way of transport can be used by the park guards (e.g. in the Bieszczady National Park) as well as tourists. It can be combined with active leisure activities (alternative tourism).

Using motorised mass transport (buses) instead of individual cars may seem to be more environmentally friendly, because the amount of pollution per passenger is lower in a bus than in a car. However, using such a way of transport involves visiting places in large groups, which contradicts the idea of eco-tourism and conscious tourism. Rail is a better alternative to buses and cars.

Long-term studies on the impact of traffic pollution on the protected areas were carried out in the Pieniny National Park. The Pieniny National Park was the first border park in Europe – between Poland and former Czechoslovakia (now Slovakia). The largest role in establishing the Pieniny National Park was played by Prof. Walery Goetel – former rector of the University of Mining and Metallurgy (nowadays AGH University of Science and Technology).

Thirty-five years ago, in this region, J. W. Dobrowolski initiated interdisciplinary studies of the impact of mass tourism (motorized in particular) on the natural environment, especially on ecosystems located near the main roads, as well as human health [Dobrowolski and Wagner 2000]. The studies referred to the location of schools and homes of children and how they were affected by the amount of lead in their blood. The main source of lead in those times was traffic. Nowadays,

more and more lead-free petrol is used, so the problem of lead has been diminishing, but the problem of nitrogen oxides remains. The amount of NO_2 was measured by the Amaya-Krochmal method of screening monitoring (using improved samplers). This method was also introduced by J. W. Dobrowolski in the Pieniny National Park 18 years ago and was used till 2003 for comparative studies in many places of natural and historical value. In many cases, practical conclusions from the studies were drawn, e.g. a new road avoiding the Ojców National Park was built.

A very attractive form of transport is water transport. Using motorboats is not recommendable in specially protected areas. An interesting form of water transport is applied in the Pieniny National Park. It is rafting through a part of the Dunajec River, from Sromowce to Krościenko (about 2.5 hrs). The view from the river of the Pieniny Mountains is magnificent. It is also an opportunity to know the local culture, because punting is a tradition in the Pieniny Mountains. It also gives employment to local people. Moreover, water transport (rowing) is used in the Drawsko Landscape Park (a centre for the Students' Scientific Clubs Movement) and the Biebrza Wetlands National Park (central-east Poland). In the latter case, for practical reasons - most places are out of reach from the ground. This is a big sanctuary of waterfowl.

Skiing is a very popular means of transport, especially in the mountainous areas. This, however, can make problems if the snow level is not very high. In such a case, dwarf mountain pine can be damaged. Other environmental problems are caused by the need to build infrastructure suitable for alpine skiing. This involves cutting down large numbers of trees. Thus, such developments should rather occur in the neighbourhood of a national park (buffer zones), but not in a national park itself.

There are several kinds of environmentally friendly transport in national parks. The most obvious is walking. Walking enables tourists to see lots of elements of natural beauty, because it is slow. However, larger distances can be covered by bicycle. In many national parks, there are special routes for bicycles. Such routes are, for example, in the Pieniny National Park and its vicinity, crossing the border between Poland and Slovakia. It has to be mentioned that not every route is suitable for cycling. In some cases, cycling can do some damage to the environment. Theerefore, it should be controlled.

5. Studies on Residential Tourism

Studies on mostly residential tourism concentrated on the areas of the Tatra and Pieniny Mountains. Started by J. W. Dobrowolski in 1968, National and, as of 1971, International Summer Schools Man and His Environment were dealing with the problems of tourism in national parks under the aspect of ensuring sustainability and economic development in the region. The results these studies were presented at scientific symposia as well as to representatives of local communities, which led to consultations and practical conclusions. The principle accepted was that the partnership of local communities, local authorities and specialists from different scientific and practical disciplines as well as students of the Students' Scientific Clubs Movement can improve the environment and quality of life. [Dobrowolski 1976 and 1977].

Residential tourism creates the need for the development of infrastructure required for accommodation. Any tourist infrastructure is a potential source of pollution and other damage to the environment. Areas inhabited by several thousands of permanent residents might be visited by hundreds of thousands of tourists. To minimise this damage, protective measures are necessary, such as building proper draining systems, including wastewater treatment stations. That increases the number of people, particularly in the peak season, and facilities neutralising negative effects caused by the increased number of people staying in one place have to be built. Efficient sewage treatment is one of the most important problems. Due to the international co-operation with Japanese experts, a new type of biological wastewater treatment station "Bando" was introduced in Jaworki (Pieniny region) [Rajpolt, Kurbiel, Dobrowolski 1990]. In many cases, hydro-botanical wastewater treatment stations are very desirable, also for aesthetic reasons.

Another problem is heating. Burning fossils pollutes the atmosphere with SO_2, nitrogen oxides and other pollutants. Thus, clean energy sources are recommendable. More and more houses in the Pieniny Mountains are heated by solar energy. The use of biofuels is also recommended.

Eco-tourism - unlike most cases of mass tourism – is focussed on local traditions. Thus, instead of using big hotels, small houses owned by the local people may be provided. This can give more job opportunities to local people. Local people can also be employed as guides (in mass tourism guides are usually not local, they are employed by big companies located where the tourist agency is from).

Good examples of environmental education are so-called "didactic routes". Such routes were made in many European countries including Poland. The Ojców National Park (North of Cracow) is a good example of such routes where information about the origin of sites, their geological structure, species of plants and animals is provided.

6. Weekend tourism

The residents of big cities like Cracow often have the need to rest in areas that seem "natural" to them. This does not have to be tourism oriented to national parks. On the contrary - mass tourism, if possible, should be kept away from national parks. This, however, must not be implemented by administrative measures. The best and the most effective way is to build, in the neighbourhood of national parks (buffer areas), an infrastructure attractive enough for people less environmentally conscious, more interested in "conventional" tourism. A survey done in the Tatra Mountains (Dobrowolski et al., unpublished) showed that many visitors go there only because it was popular and "fashionable". For such tourism, creating "fashionable" places in less environmentally valuable areas would be necessary to move mass tourism from places more environmentally valuable and more sensitive.

Areas near big cities (e.g. the Niepołomice Forest near Cracow and the areas of natural and even artificial water ponds can also provide opportunities for environmentally-oriented tourism [Wagner 2000 and 2002]. It is also important to increase the tourist attractiveness of areas formerly destroyed by mining or other types of industry. The reclamation of such areas can allow converting them into

places suitable for many species of wildlife such as waterfowl or amphibians finding their sanctuaries in water bodies made after open cast mining was terminated. This is the case of water ponds like Zabierzów Bocheński made after the exploitation of gravel (commune Niepołomice, near Cracow).

7. Eco-tourism and Problems of Globalisation

One of the common aspects of globalisation is the unification of culture. Sometimes it can be a positive phenomenon – if good cultural patterns become more widespread this way. Unfortunately, in many cases, the unification of culture brings damage to local traditions, which can be either destroyed or converted into meaningless gestures cultivated only for the purpose of tourism. Local traditions often work in harmony with the environment, so destroying them also means devastating the environment [Wojciechowski 1996].

In some places, local people build tourist infrastructure mainly to meet the requirements of tourists interested only in passive recreation on the beach during the day and in pubs at night. Such a phenomenon can be observed e.g. on the Mediterranean coast, where all tourist settlements are isolated from local communities, and their style does not reflect local culture, neither does it meet environmental standards.

Eco-tourism can play an important role in the environmental education of society. Eco-tourist trips are usually arranged to get more knowledge about the place a visitor wants to see. Getting such knowledge makes a visitor feel more respect both for the place and the local people. An eco-tourist is a conscious tourist in terms of both the environment and culture.

To promote eco-tourism, one should pay attention to the training of decision-makers, local government officials, teachers and NGOs for the promotion of sustainable development, because eco-tourism is one of the important factors pertaining to sustainable development. This aspect was particularly stressed in the summer schools “Man and Environment”. Many of the participants at these schools later on worked in the area of environmental protection as directors of national parks and officials at different levels.

Increasing environmental awareness would also help to fight some negative examples of pseudo-ecotourism. The example of safaris in Africa was already given, but less “exotic” examples can also be found. For instance, in many areas of natural beauty, including the Masuria Lakes in the northeast part of Poland, motor races are organised. Their environmental impact can be disastrous for wildlife [Zaręba 2000].

The growing importance of eco-tourism requires networking among experts from different disciplines who work in training for sustainable development with a particular stress on nature and culture heritage. Improving the co-operation with NGOs and local communities as well as research methods and training for sustainable development should contribute to solving the crucial problem of minimising negative effects of mass tourism.

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Philippos Nicolopoulos*

The Large Scale Investments in Alternative Tourism and Sustainable Development: The Case of Crete and Arcadia

1. Industrialism and the initiative of the "Ideology of Development"

It is well-known that in the last two decades a great and bitter critique has been launched against the "ideology" of development, as it emerged in western terms. The core of that critique is a rejection of the idea of an assumed *universal theoretical development scheme*[a] which can apply in every society and culture, whereas actually this scheme was born in Western capitalist societies (mainly Western Europe and North America), and its rationale is based only on the Western mentality. The idea of "development" is closely associated with the idea of an *evolutionary social process with stages,* in which every new stage is supposed to be higher (in qualitative structures and functions) than the older one. A "target" type of society, of course, is the industrial and rational type of European and American society. Even the former socialist and Eastern Bloc countries have been influenced by that western industrial model, and they gave priority to strengthening the industrial sector of the economy and to systematically exploiting natural and human resources.

Thus, in general terms, development and industrialization in modern times were and are closely connected. Moreover, that ideology is associated with the "technocratic" spirit of the West, and it has its roots in the *rational anthropocentrism and optimism of the Enlightenment* and in the *evolutionary European social theories* of the 19th century[b].

After the collapse of the Eastern Soviet Bloc, the notion of Development is considered to be almost identical with neoliberalism and the market economy forces. These forces tend to ignore any rule and restraint as regards social control or the protection of the environment. In many developing countries under Western influence and in many ex-Eastern Bloc "socialist" ones the tendency to make money using any

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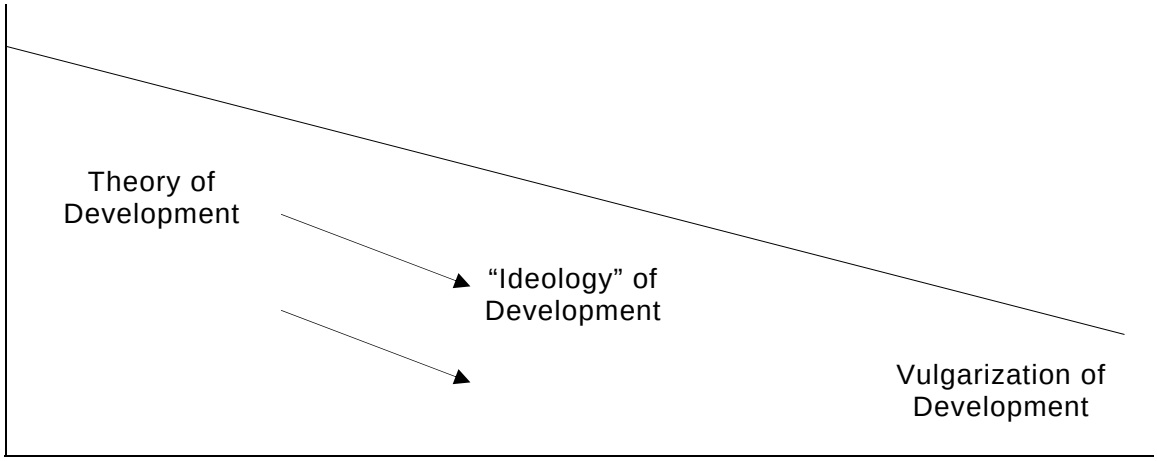
* Philippos Nicolopoulos, University of Crete-University of Indianapolis, Athens Campus

a W.W.Rostow, The Stages of Economic Growth, 2nd ed., London, Cambridge University Press, 1971, pp. 4-17; G. Almond and B. Powell, Comparative Politics: A Developmental Approach, Boston, Brown and Co., 1966; G.Almond and J.S.Coleman (eds), The Politics in Developing Areas, Princeton, Princeton University Press, 1971, pp. 3-64, 109-138, 183-233, 391-444; Philippos Nicolopoulos, Systems Theory, The Western Functional Conception of Development and the Differences of Value Worlds and Cultures, paper presented at the 4th International Conference of Cociocybernetics, Corfu, Greece, June 29-July 5, 2003, pp. 1-2.

b K. Marx, Capital (vol. 1-3), London, Laurence and Wishart 1954; K. Rostow, The Stages of Economic Growth, A Non-Communist Manifesto, Cambridge, Cambridge University Press, 1960; K. Popper, the Poverty of Historicism, London, Routledge and Wegan Paul, 1957, pp. 41-49. Philippos Nicolopoulos The Ideology of Development and the Ecological Culture: Value Systems in Conflict at the Cases of Crete and Corfou (Greece) and the Difficulties of Decision-Making Process, paper presented at the XV World Congress of Sociological Association, Brisbane, Australia, 2002, p.4.

means whatsoever leads to an awful *phenomenon of corruption*. Definitely, one has the right to talk about a kind of *vulgarization of development*[c]! In this sense, the term does not mean *qualitative* (not only quantitative) *structural changes* (mainly with a view to the 2nd sector of the economy), but simply one's attempt to "make money" in any possible way, legal or illegal, in order to participate more and more in the opportunities of mass consumption and media – centered bourgeois society! (see figure 1).

Figure 1



On the other hand, it was obvious that the peripheral and semi-peripheral capitalist countries could not catch up with the so-called metropolitan industrial ones for historical reasons. The supposed "universal" evolutionary scheme of moving towards an industrial and prosperous "paradise" could not apply to all countries with the same results. Differences with regard to the particular historical routes, the cultural and value orientations and the structures of particular national social formations, constituted an obstacle which has been hard to overcome. Thus, the position of each country in the world distribution of labor was not and is not defined according to a *uniform linear historical evolution,* but according to the *(economic and political) power relationships,* as they have evolved since the 16th century in the Euro-Mediterranean region and in the Euro-Atlantic region of the world, that is in the regions of the world in which the capitalist system developed and prevailed.[d]

As regards markets and the increase of mass consumption, however, all countries had and have to achieve (according to the capitalist mentality) common

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[c] Atul Kohli, "Introduction", in the Atul Kohli (ed.) The State and Development in the Third World, Princeton University Press, 1986, pp. 8-17· Philippos Nicolopoulos, The Ideology of Development…, op. cit., p. 3; James Petras, Imperialismos, Kinonikes Taxis and Ikonomiki Anaptixi, Imperialism, Social Classes and Economic Development), Athina (Athens), Stochastis, 1983, pp. 139-161.

[d] I. Wallerstein, The Modern World System: Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century, London, Academic Press, 1974; I. Wallerstein, The Modern World System: Mercantilism and the Consolidation of the European World Economy; I. Wallerstein, Historical Capitalism, London, Verso, 1983.

goals: They should operate in the largest possible markets and produce the largest possible groups of consuming people. So the great critique against the Western "ideology" of development (which has often ended up simply as an "obsession with economic growth") expands and becomes also a *critique against over-consumption* or against ways of life which cannot guarantee the quality of social relationships or harmonious relationships between man and natural ecosystems. The "target" of that critique is a complicated crisis of the *modern* (*or post-modern) world* with many dimensions, i.e. structural tensions because of socioeconomic inequalities, crisis of moral values, crisis with regard to the preservation and protection of the natural environment and the totally balanced relationship between that environment and the economic and productive human activities.

The ever growing rationalization of the economy and society and the prevailing instrumentalization of knowledge processes has been combined with a strong *materialistic orientation*, which dynamite the initial moral values[e] of capitalism itself! The ever growing materialistic orientation is constantly associated with the phenomenon of the over-exploitation of natural and human resources. The *over-exploitation is the other side of over-consumerism!* And all these tendencies are reinforced on the basis of a world of "materialistic growth". Hence, the general ecological crisis depends on this type of society, i.e. society of industrialism and over-consumerism.[f]

2. Sustainability and the interest in intact natural and cultural capital

Nevertheless, the global structural tensions and contradictions or the general ecological crisis cannot prevent countries, regions and areas from thinking about their survival in dignity in that so "shaken" and "conflict-centered" world and about their prosperity. Specifically for the less developed countries, the point is not to bring down forever the "levers of development", but to find what kind of development fits them. But generally in all countries, thanks to the above mentioned critique and the general environmental problems during the last two decades (especially after the Rio

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[e] Dannel Bell, The Cultural Contradictions of Capitalism, Harper Collins Publ., 1996, xxv-xxix, 21-22, 285-314.

[f] Daniel Bell, as is well-known, has called the stage of late capitalism "post-industrial" society or service society, where the predominant element is not the manufacturing industry but the service industry, information and "knowledge". Even though we accept this thesis, "post-industrial" does not mean "cancellation" of over-consumerism or a diminishing of the "spirit of industrialism". On the contrary, changes at the level of "symbols", "signs" and cultural processes, as Jean Bandrillard believes (Douglas Kellner, Jean Bandrillard, from Marxism to Postmodernism and Beyond, Stanford, Stanford University Press, 1989, pp. 12-32), facilitate this spirit, because they are associated with the criteria of a reinforced market economy (more demand and more production), although many contradictions have emerged in the whole economic sphere of society, as D. Bell himself maintains, (D. Bell, op. cit., p.p. xxv-xxvii). Thus the pressures upon the environment are not diminished. On the other hand, the service sector in many cases works for the manufacturing sector of the economy. Hence, the ecological restraints and defenses should be raised in accordance with their own arguments, independently of the discussion if "we are in an industrial or post-industrial society".

International Conference, 1992), a new awareness of the relationship between development, the protection of the natural environment and the quality and preservation of the built environment has emerged .[g]

The less developed countries know that the industrial countries of the so-called "first world" or the so-called "North" are mainly responsible for the contemporary ecological crisis, simply because it is the main cause of the general environmental problems. They (the countries of the North) have no right to hinder them (the less developed countries) in reaching a similar level of manufacturing activities and prosperity. So they insist on development processes, and some of them reach very high development rates.[h] On the other hand, they understand that they cannot easily catch up or cannot catch up at all with the "North" regarding the size, the quality and the rate of manufacturing activities, so they try to realize *another type of development* in which they can make use of some of their intact *natural and cultural resources* through *specific and alternative kinds of tourism.* Some regions (e.g. Nepal, Kinabalu in Borneo, the case of Mata de Sesimbra in Portugal with participation of WWF) prefer a non-industrial type of development, based on their so-called *natural* and *cultural capital,* which often is more intact in comparison with the corresponding capital of the countries of the "First World". In other cases, the economic activities connected with the above mentioned kinds of capital are complementary to the productive processes of the 1st and 2nd sector of a country's economy (e.g. Singapore, Indonesia, Brazil). Beyond that, some protagonists of contemporary ecological movements believe that many peripheral non- industrial countries can develop in their own individual way by deliberately avoiding the industrial model and giving priority to the 1st and 3rd sectors of the economy. This is Ivan Illich's view, according to which the industrial type of development is a kind of organized trap. People lose their initial *vernacular skills*[i] and become increasingly dependent on specific structures which, and experts whom, they cannot control.

In parallel, even metropolitan industrial countries tend to preserve systematically their own intact natural capital (to the extent that such capital still remains in some of their areas) and they try to turn it to advantage on the basis of a new *integrated type of development* in which the *environmental dimension* is seriously taken into consideration (e.g. the case of Vermont State or some areas of the Mountain States in U.S.A., Switzerland, Eden Project in the rural South West of England). One can definitely say that the search for a new type of development does not characterize only the policies of less developed countries but also the policies of the developed ones. One can say that we see a more general *world-wide reaction against the dire consequences of industrialism and "developmentmania" associated with the*

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g Michael Decleris, The Law of Sustainable Development, General Principles, European Communities, 2000, pp. 7-9, 27-37, 53-56; The Economist, April 23rd-29th 2005, p. 11 ("Rescuing Environmentalism").

h Let us mention, for example, the case of China, which is the world's second biggest economy with a growth rate of more than 9% a year over the last few years (The Economist, October 2nd-8th, 2004, pp. 9-10, November 20th-26th 2004, pp. 11,57-58, March 266th-April 14th 2005, p. 11).

i Ilich, Ivan, Deschooling Society, London, Caldler and Boyars, 1971.

manufacturing sector of the economy. It is not simply a confrontation with the spirit of global capitalism. It is a deeper confrontation with exaggerated developments in manufacturing, independently of ideological and political differences of some regimes, of structural differences of some social systems and of different positions in the world distribution of labor (what I'm referring to here are the inequalities between Metropolitan and Peripheral countries or between "North" and "South").[j]

The *innovative dimension* of this kind of development is achieved in a new synthesis between the industrial spirit and the ecological parameters which must accompany it and any human intervention in the *natural environment.* We are dealing with a new *qualitative combination* of the *elements of the three sectors of the economy,* priority given to those socioeconomic activities which avoid the disastrous results of the former overexploitative industrial model. The elements of the three sectors and the relationship between man and nature are *rearranged* and *restructured,* so that the *development process does not compromise meeting the needs of future generations.*

After the Rio Declaration (1992), this type of Development was called *sustainable* (S.D.) and its typical definition has been given by the Brundland Commission (World Commission on Environment and Development) in 1987: *"To meet the needs of the present without compromising the ability of future generations to meet their own needs".*[k] The essence of that definition is that *limitations* are to be imposed by political and social systems and their scientific-technological knowledge on the environment's resources. But the deeper meaning of *sustainability* includes *a set of social and cultural values and choices, which are the necessary prerequisites* for the implementation of the above mentioned limitations.[l]

Thus, sustainability is not only an issue of natural resources, but also of socioeconomic structures, culture, mentalities and value choices. S.D. is not only related to the protection of the natural environment in the primary sector of the economy, but intends to have an impact on any sector of the economy and on any human activity. The Rio Declaration adopts a systemic approach which constitutes an "overall strategy for a global transition to S.D." Thus, any development problem, any development policy and any investment activity in less developed countries should be seen in the light of sustainability, which must not be sacrificed by any means to the "Gods of ever increasing economic growth", even when the need for investments iincreases and the international economic competitiveness of the country is to be reinforced.

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j At this point I follow, to an extent, the Center-Periphery theory in order to highlight general social characteristics which refer to large groups of countries. See I. Wallerstein's book The Capitalist World-Economy, Cambridge (England), Cambridge University Press, 1979.

k The World Commission on Environment and Development, Our Common Future, Oxford, Oxford University Press, 1987, pp. 46-46.

l Michael Decleris, op. cit., pp. 44-48; Our Common Future, op. cit., pp. 46-54.

The S.D. should be based on the three capitals, *natural, social* and *cultural,*[m] which should be enhanced not only for people's prosperity but for the quality of life in environmental terms. Some basic principles (according to the former Vice-president at the Hellenic Council of State, writer and expert about sustainability, Michael Decleris) of S.D. are:

1) Principle of Public Environmental Order
2) Principle of Carrying Capacity.
3) Principle of Obligatory Restoration of Disturbed Ecosystems.
4) Principle of Biodiversity.
5) Principle of Common Natural Heritage.
6) Principle of Restrained Development of Fragile Ecosystems.
7) Principle of Spatial Planning.
8) Principle of Cultural Heritage.
9) Principle of Sustainable Urban Development.
10) Principle of the Aesthetic Value of Nature.
11) Principle of Environmental Awareness.[n]

3. Large scale investment and the alternative forms of tourism

Let us focus now on our more specific issue and let us see how the principles of sustainability apply here. We will talk about large scale investments in the sector of *alternative tourism* and we will talk more specifically about the cases of Crete and Arcadia in Greece (in those areas I have carried out primary empirical research). It is well-known that Mediterranean developing countries or areas (Spain, South Italy, Greece, Turkey, Cyprus, etc.) include excellent coasts for mass summer tourism. In the last decades, this kind of tourism (the so-called 3 "S"-tourism, i.e. Sea, Sun and Sand) greatly increased the annual income of these countries and contributed to their national economies at the expense of the protection of coastal ecosystems, of the virginity of some areas and of the preservation of their domestic cultures. Nowadays, as the market forces of globalized capitalism are becoming stronger, the pressure that some companies have exerted to encourage new investments in tourism has increased. The response of these countries should be the spirit of limitation of such investments and activities, even though they understand that they have a natural advantage in that field and they can increase their G.D.P. by such means. Limitation does not mean refusal of tourism, but limitation of the mass conventional type and creation and reinforcement of the kinds of *alternative qualitative tourism (A.Q.T.)*, which constitute a *sustainable touristic development (S.T.D.).* The S.T.D. can not be derived from the principles of S.D. That is why the principles of S.T.D., as they have been defined in the *European Charter of Sustainable Tourism* (1990), are similar to,

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[m] Michael Decleris, op. cit., . 47.

[n] Ibid pp. 17-21.

or a kind of applied specification of the general principles of S.D.[o] And the response should be given by an *effective state* and *law,* which in cooperation with the organizations of local government, the local communities, the experts, other social organizations and the grassroots movements, can establish a *buffer* to the pressures of big companies interested in large and profitable investments.

The A.Q.T. is reducing its commitment in coastal areas and extending to the mainland rural areas, trying to take into account their history and culture or trying to motivate tourists and visitors to engage in new important activities beyond the spirit of the triple "S" (nature-oriented tourism, mountain sports tourism, athletic tourism, ecotourism, various specific types of sea tourism, medical tourism, cultural tourism, historical and archaeological tourism, educational tourism, expo tourism, conference tourism etc.[p]). Moreover, it often connects with organic activities of the 1st sector (*organic farming and live stock*), various kinds of *service industries* and with industrial units of the 2nd sector of the economy linked to traditional activities of 1st sector. The systems theory can contribute to the *sustainable management* (S.M.) of A.Q.T. units to a high degree. For that reason, it can *organize the areas in interrelating and interdependent systems, and it can study their mutual impacts.* (see figure 2).

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[o] According to the European Chapter for Sustainable Touristic Development, the basic ten principles for this sort of touristic development are:

Respect for the carrying capacity of the touristic area (both of man-made systems and of natural ecosystems).

Contribution to the protection and enhancement of the natural and cultura heritage of the area.

Protection of the natural resources of the area.

Support and reinforcement of the local economy.

New jobs.

Reinforcement of people's participation in the qualitative touristic development of the area.

Demarcation of protected natural areas to which people can have access.

Encouragement of people's attitude and behavior - their respect for the environment (ecological awareness).

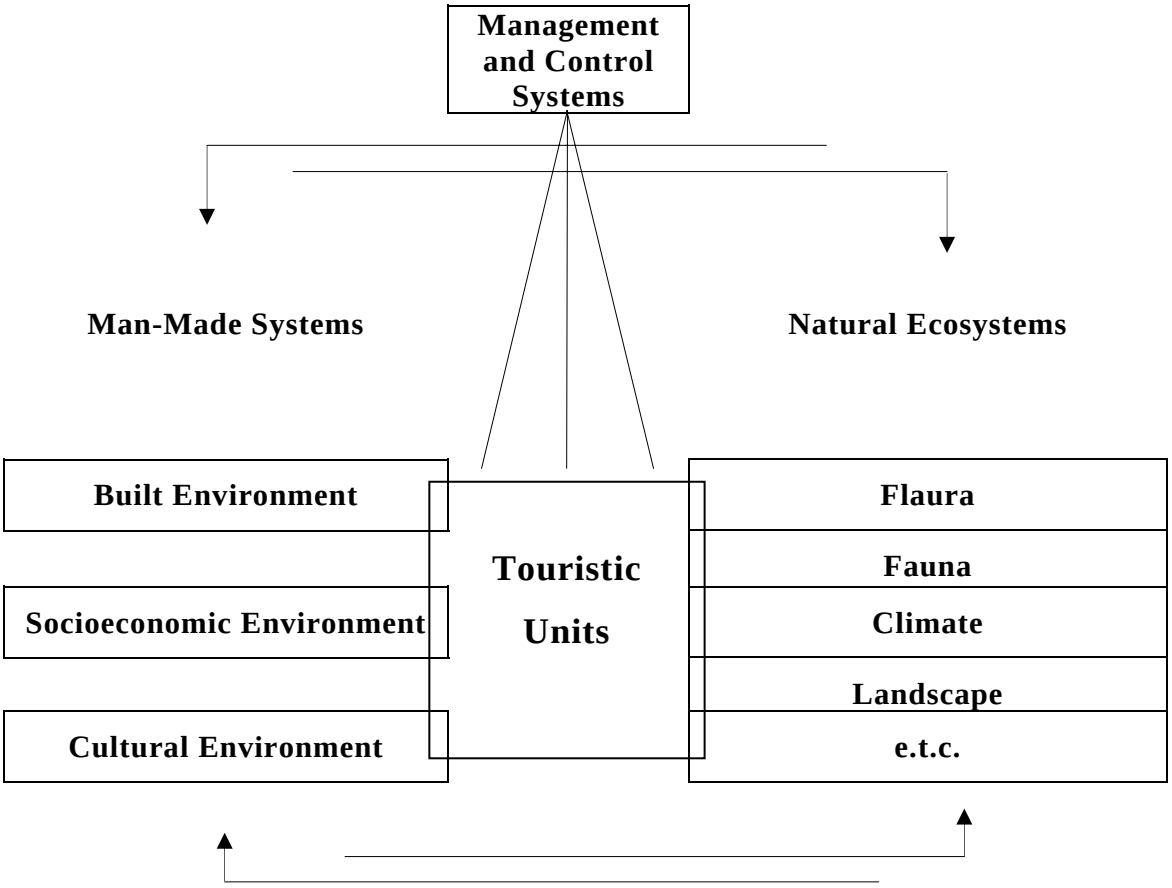
Development of high quality tourism.

Promotion of this kind of development, which can be a good example for other sectors of the economy.

H. Coccossis – P. Tsatras, Viossimi Touristiki Anaptixi ke Perivallon, Athina, Kritiki 2001 (Sustainable Touristic Development and Environment), Athens, Kritiki, 2001), pp. 182-189; H. Coccossis "Tourism and Sustainability: Perspectives and Implications" in G.K.Priestley, J.A. Edwards and H. Coccossis (eds), Sustainable Tourism? European Experiences, CAB international, 1996; German Federal Agency for Nature Conservation, Biodiversity and Tourism, Frankfurt, Springer, 1997 (Appendix K); WTO (World Tourism Organization), Internet site.

[p] H. Coccossis – P. Tsatras, Viossimi Touristiki Anaptixi ke Perivallon (Sustainable Touristic Development and Environment), op. cit., pp. 82-83; B. Lane, Tourism Strategies and Rural Development: a Review for the OECD, Bristol, University of Bristol, 1993; B. Weiber, M.C. Hall (eds), Special Interest Tourism, London, Belhaven Press, 1992.

Figure 2



The A.Q.T. constitutes a S.T.D., so it limits investments and touristic activities to some extent (including the size of units or settlements and the number of tourists) and does not go beyond the *carrying touristic capacity* of the concrete area. The quantitative definition of those limits depends on the existing natural and cultural capital and on the *specific circumstances* of the touristic area. In addition, it can not be measured precisely, in advance and over long periods of time, because the existing data are not sufficiently available or they are ambiguous, even though the whole issue is crucial. That's why a *mechanism of monitoring* is necessary to be established in order to check the *outputs* of the whole *integrated socioeconomic and environmental system of the touristic area.* If some limits area surpassed this kind of tourism is not alternative, and it obtains again the mass characteristics with the well-known negative impacts, in spite of whatever announcements, declarations and advertising touristic units directors or tour operators come up with.

Let us talk more concretely. If we desire to measure the Carrying Capacity of Touristic Development (C.C.T.D.) of an area in order to be in compliance with the principles of A.Q.T., we use some indicators. For example, the *study of Touristic Development of the Periphery of Crete,* carried out by the company "E.T.A.M.

Ε.Π.Ε."[q] accepts four indicators, following the methodology of A. Parpairis. Those indicators are:

1) I. of *tolerable number of tourists* (the ratio of the number of tourists to the permanent population of the area).
2) I. of *touristic tension,* which refers to the quality of touristic services (the ratio of touristic beds to the permanent population).
3) I. of *conservation of local tradition and culture.*
4) I. of *technical infrastructures* which refers to the capacity of infrastructures to cover the needs of tourists.

The above mentioned indicators can be graded (the researchers put the grades 0-2), but only the first two are *quantitative.* Of those two, only the second one can be directly measured, because only for that one there are usually data available. The others are based on a *qualitative assessment.* We can add some new indicators in order to have a more holistic and sustainable approach. Those indicators are:

1) I. the *social acceptance and integration of touristic activities,* which refers to the positive or negative attitude of the permanent population with regard to concrete touristic activities.
2) I. the *economic integration of touristic activities,* which can be assessed by comparing the per capita annual income of the touristic area before those activities with its income during the years of tourism and by the ratio of working people in tourism to the permanent population.
3) I. the *communication effectiveness between man made systems* of the touristic area.
4) I. the *organizational order* of the touristic area, which refers to the capacity of the local administration and the administration of touristic units to control the whole area, not allowing visitors and tourists to violate the law and the existing rules of correct behavior and exercising the appropriate protection of natural and built environments.
5) I. the *pollution* of the touristic area according to positive methods of environmental sciences.
6) I. the *conservation of the local natural ecosystems* (flora and fauna), which refers to the possible disturbance or disappearance of some species of flora and fauna.

As regards the last six indicators, one can say they are also gradable, but many of them are based on qualitative assessments (the first, the third, the fourth). Thus, our conclusion is that the C.C.T.D. should be assessed not only by *quantitative methods* but also by *qualitative evaluation.* The study itself about the *Plan of Spatial and Urban Organization of the Open Town of the Municipality of Ifanos (Crete),* the

[q] "E.T.A.M. E.P.E." Meleti Touristikis Anaptixis tis Kritis (Study of the Touristic Development of the Periphery of Crete) ordered by the Greek Organization of Tourism (EOT), Athens, 2003, pp. 149-266.

so-called "SHOOAP"[r] in Greek, which uses the above mentioned methodology of A. Parpairis, accepts that many indicators are assessed in the qualitative way.[s]

The issue of carrying capacity is more important when we focus on *large scale investments* (L.S.I.) in A.Q.T. Alternative tourism is usually connected with small touristic units, simply because it is interested in avoiding serious disturbances of natural ecosystems. Meanwhile, what is happening to the L.S.I.? The L.S.I. in A.Q.T. is a specific category, which includes large touristic complexes (T.C.) based on *high quality infrastructures* (H.Q.I.) intending to offer *high quality touristic services* (H.Q.T.S.). It is connected with athletic activities, ecotourism, thematic, historical, archaeological, religious, cultural, geological and other kinds of alternative tourism.

Some examples in Crete are the Cavo Sidero Project, the Cavo Placo Project (Eastern Lassithi, area of Eastern Crete) and the Triopetra Resort (Southern area of Rethymno Prefecture). These projects are going to be implemented. The first will include a total of 7.000 beds in five hotels, (4-star minimum), apartments, houses and villas. The 7.000 beds will be distributed in five touristic villas in the area of Cavo Sidero in Eastern Lassithi. The facilities will include golf courses, big conference centers, an open amphitheatre, athletic arena, ecological centers, a cultural center, botanical garden and marina. The whole T.C. will be built in an area of 25.000 stremmata of the land of Toplou Monastery, but the constructions will cover less than 1% of that area.

The second one will include a total of 4.000 beds in luxurious hotels and apartments, a convention center, athletic facilities and a golf course. The third will include a total of approximately 1.500 beds in two luxurious hotels and luxurious villas. The facilities will include a convention center, a center of ecotourism, an athletic arena, a center of outdoor nature-oriented activities and many other rooms for various activities and cultural events. The first and the second investments will be implemented by the area of Itanos Municipality and in total will not surpass the C.C. of the area, since the "SHOOAP" assesses that C.C. is 16.000 beds plus.

The above mentioned T.C. is something new in Crete. According to data I collected in the research program with the title *Socioeconomic Structures, Development Policy and Ecological Problems: The Case of Crete*[t], so far the tourism in Crete has developed in a rather *rough way without spatial planning and organized steps at the expense of the natural ecosystems* and *local culture and value systems*. The Cretan people actually pursue a new spirit of tourism with new qualitative

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[r] Dimos Itanou (Municipality of Itanos), Schedio Horikis ke Ikistikis Organossis Aniktis Polis, Σ.Χ.Ο.Ο. Α.Π., abbr. in Greek – 2004 (Planning of Spatial and Urban Organization of Open Town). The Municipality of Itanos is located in Eastern Lassithi, which is an area of the Prefecture of Lassithi, in the most eastern part of Crete. We referred to Municipality of Itanos and its "Σ.Χ.Ο.Ο.Α.Ρ." because two of the L.S.I which will be mentioned below are located in that municipality)

[s] Ibid, pp. 18-19.

[t] Philippos Nicolopoulos, Report on the Results of the Research Program (1st and 2nd stages) with the title "Socioeconomic Structures, Development Policy and Ecological Problems: The Case of Crete" submitted at the Greek Ministry of Spatial Planning, Environment and Public Works and approved by it (The Report is written in Greek), Rethymno, 2002.

infrastructures and effective protection of the natural environment, but it is not obvious that they are ready to adapt to the new touristic environment. Their income from tourism in the last few years has rather decreased, as well as the quantity and the quality of tourists. A new kind of investments, like those I mentioned before, is a new upgrading step. It depends on the *way* those investments will be implemented *(strict Environmental Impact Studies, Sustainable Management Strategy, effective administrative mechanisms, new mentality* of local people). In addition, I would like to emphasize that, so far, bureaucratic obstacles against the implementation of investments have worked against a clear spirit of protection of the ecosystems in the touristic areas. It is important that we fully understand that in *Greece the bureaucratic processes often constitute a problem withou providing any effective solutions.*

Big capital pushes for a profitable L.S.I., but actually the periphery of Crete needs new jobs and new sources of income. The point is to have *interacting social systems* to find some convergent policies with a real concern for the preservation of natural and cultural capital and without compromising the needs of future generations. We live in *a complicated world* and the need for *new syntheses* is pressing. Trying to confine contradictions, we can open the way for *innovative combinations*.

The more an investment in A.Q.T. is L.S., the more the system of the whole T.C. becomes complicated. The more the system of T.C. becomes complicated, the more the *organizational order* should be *upgraded (Ashby's law of "requisite variety"*[u]*)*. The more the system of T.C. becomes complicated, the more the *quality of the whole touristic intervention* (i.e. organizational structure, value priorities, scientific efficiency) should be upgraded.

Another rural region in which A.Q.T. can be implemented is the *historical Arcadia*[v]**.** According to statistical data from the National Statistical Service of Greece, the population of Arcadia has been decreasing over the last few years[w]. That means that the traditional activities of the 1st sector, which were the predominant ones for years, cannot be upheld by the younger generations, while tourism in general does not have a strong enough presence[x]. The only geographical axis of Arcadia which has

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u Felix Geyer, The Challenge of Sociocybernetics, paper presented at the 13th World Congress of Sociology, Bielefeld, July 18-24, 1994, p. 18, where a reference to the notion of Ashby's law of "requisite variety" is made.

v We compare those regions of Greece (Crete and Arcadia) because both, besides their natural beauties (natural capital), have a long and very rich history and a very important cultural capital. Thus, they are appropriate regions for the development of alternative forms of tourism.

w According to the National Statistical Service of Greece, the total population of Arcadia in 1981 was 107.932, in 1991 it was 105.309 and in 2001 102.035 permanent inhabitants. By contrast, there was a decrease in the population of Crete during the same time.

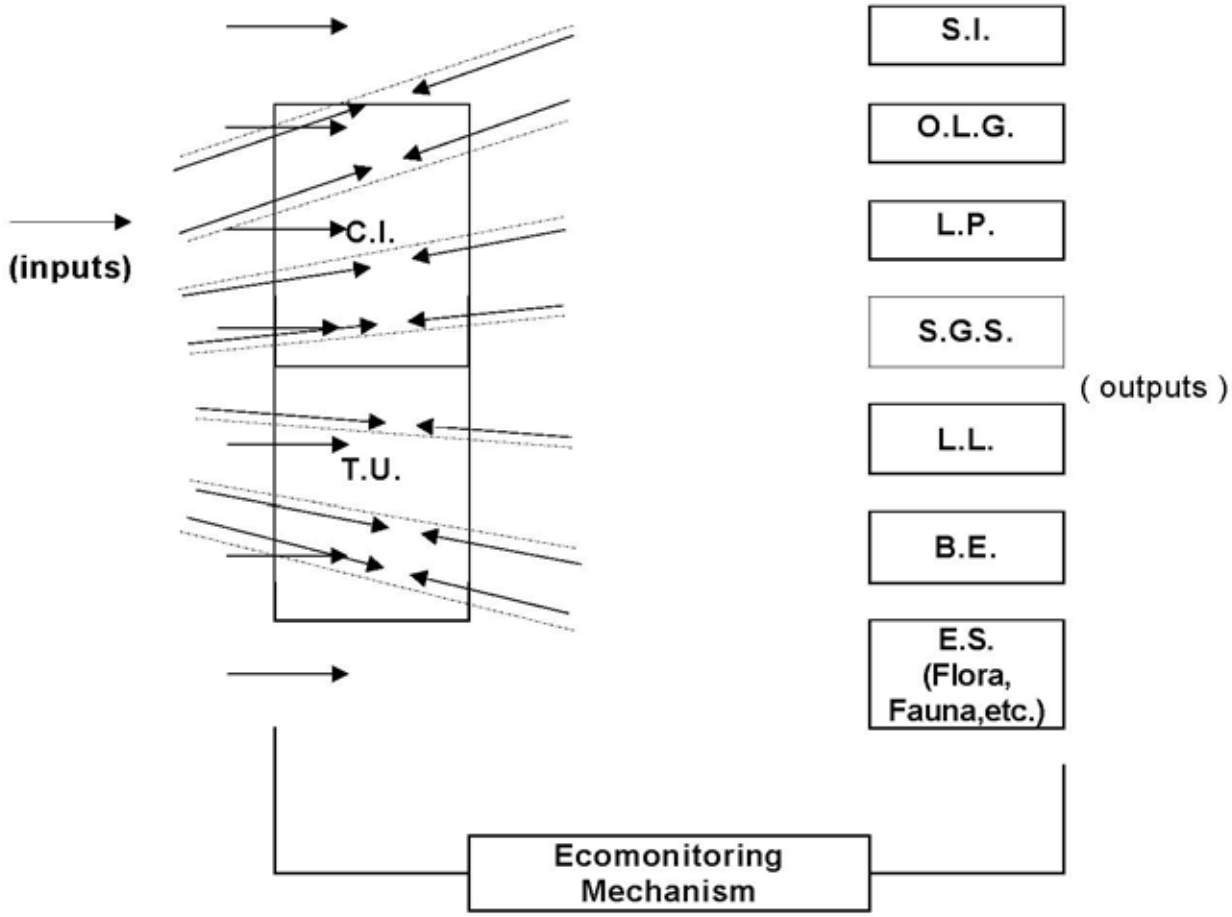
x One can find data and assessments about the touristic development in Arcadia in EOT (with the cooperation of A. Kotzampopoulos and G. Pavlakis), Meleti Touristikis Anaptixis Peripherias Pelopponnisou, 1st Stage, (Study of Touristic Development of Periphery of *Peloponnissos),* 2002, pp. 84-100, 18, 164-170, 353-384.

made some steps forward in A.Q.T. is the axis *Kapsas, Levidi, Vlacherna, Vitina, Lagadia, Dimitsana, Stemnitsa, Karitena* (around the *Menalon mountain).* The progress made in some villages of the *historic mountain Parnon* is much smaller. L.S.I. in A.Q.T. has not been implemented, although a presidential decree for the *ecological park of Parnon* with zones of high-quality development has been expected to be signed and issued for many years. But some luxurious touristic units, at a level associated with A.Q.T., have been constructed (e.g. luxurious hotels in restored old mansions of the company "Country Club" or luxurious hotels in mountainous Vitina and Stemnitsa or Chalet "Elati" in the forest of the mountain *Menalon*). The problem with those luxurious units is that the social surroundings have not always corresponded to A.Q.T. One can observe a *socioeconomic and cultural gap* between them.

It is obvious that if we compare Crete and Arcadia from the perspective of L.S.I. in A.Q.T., the former is much more advanced, although the latter has all the appropriate natural and cultural capital for this kind of tourism. The already existing coastal tourism in the former and the fact that the former has all the natural beauties and the climate of a Mediterranean island contribute to that advantage. It should be said here that all the above mentioned L.S.I. in Crete are close to the sea. This is an indicator for A.Q.T. in rural regions of Greece needing much more promotion and backing from many decision-making centers as well as much more infrastructure and marketing. From my field studies in Arcadia, I have realized that the Arcadian people consider as responsible factors for those weaknesses *the indifference of the politicians and the lack of an effective peripheral policy in rural regions of the country.*

On the other hand, the L.S.I. of Crete should be protected from the momentum of the spirit of coastal tourism. Thus, the limits of C.P.T.D. should always be checked by an *ecomonitoring system* (E.M.S.), which can work on the basis of the model *"input-output-feedback"* and on *principles of sociocybernetics* (self-reflexivity of actors, flexibility of actors according to the understanding of the meaningful communication between particular social systems, self –steering etc., see figure 3).

Figure 3



Where:

C.I.	:	Companies' Interests	S.G.S	:	Socioeconomic system
T.U.	:	Touristic Units	L.L.	:	Local Landscape
S.I.	:	State Institutions	B.E.	:	Built Environment
O.L.G.	:	:Organizations of Local Government	⋯⋯		Interrelationship
E.S.	:	Ecosystems	→ ←		
L.P.	:	Local People (with their culture)			Contrasts or Conflict Process

The C.P.T.D. and the sustainability of T.C. can not be assessed once and for all. The need for *repeating checks* always remains. The E.M.S. is a guarantee and *should not be blocked by the interests of investing companies*, but should work as neutrally as possible. In addition, it should accept the social control of local communities and of experts. The ultimate positive factor of A.Q.T. is the *communication* and *cooperation* with local communities, thus permitting their *feedback* to be evaluated in a creative and flexible way.

Part 4

Living Space Resources, Evaluation of Raw Materials, Agricultural and Food Policy

Drago Muvrin*

Sustainable Development through Research and Learning
Sustainable Development and Habitation
An Approach to the Use of Living Space Resources

Summary

This paper discusses the relationship of sustainable development and habitation in a holistic approach to living space, land and housing. Human habitation used to be closely connected with the tilling of soil and security. Villages or towns had been a place of living, combining dwelling, agriculture, gardening, raising livestock, and craftsmanship, often within a household or settlement. Fortified towns housed peasants, craftsmen and traders; inhabitants cultivated their land and gardens outside the fortification. Industrialism has brought change, separating rural from urban dwellers. Industrialized agriculture requires fewer hands; eventually it eliminated the average family from land and environment. The result: an uprooted population, deprived of experience of nature continued living fragmented lives in fragmented space. Disintegration of stable families followed. Communities that survived throughout centuries on unproductive land, not useful for profitable agriculture, were doomed to perish. The process of rural depopulation continues while more land is transformed into hunting ground, wasteland and deserts.

The family and local community cannot survive and progress without their living space. The living space of the local community is the only development resource for the greater part of humanity, and by far the largest number of communities. And this situation can prevail in the future. There is no need for the colonization of deserts of other planets. Appropriate use of living space is the key to development and survival. An enriched living space and a protected biodiversity and environment is the best investment in the future, the largest savings that can be handed over to future generations. Yet human habitation is considered like consumables of a transient character, alongside morality, which has evolved within stable local communities. Living space is a development resource that can increase in value by appropriate use; it is, at the same time, a natural resource as well as the product of the most complex interdisciplinary work in developed society. Careful planning and design are necessary if there is to be a transfer of any resource into a product, a process that modern states apply in the production of consumables or useless weaponry, both of which contribute to the degradation of the environment. Living space ignorance and illiteracy have yet to be conquered; they stem from disregard of the family home. Society has lost the home base of experience of nature, which is at the same time a nursery of eco entrepreneurship. The paper discusses the eco neighbourhood of four generations, an environmental settlement where different interests regarding land can be reconciled. A strategy of sustainable development

* Drago Muvrin, E-mail:drago.muvrin@hnd.hr ; Eko usmjereni razvoj, Eco Universal Revival

should begin with the design and protection of the family living space and development of family homes and of the local community, in order to appreciate the environment, the home of all the living world. The home, oikos, homestead of different occupations and eco entrepreneurship is what *oikos, eco* means. This is the place of reconciliation of economy (eco, home+nemein, manage) and ecology (eco home+logy, study, discourse)

Keywords: sustainable development, habitation, stable family, wasteland, living space, biodiversity, environment, living space ignorance, eco neighbourhood - environmental settlement**,** environmental planning and design, home, eco entrepreneurship

1. Introduction

Contemporary communities cannot survive on their resources of living space, which helped them to evolve and develop, using only hand tools and animal labour. How can cities and their civilization survive, after their human and natural resources of living space are exhausted? According to the dogma of the survival of the fittest, only the powerful would survive, extending their exploitation to the living space of others, which makes power more important than living space improvement. Modern cities have lost interest in the development of small communities on which they always depended to satisfy basic needs - food and labour. Instead of fostering ties with their resources of sustenance, cities steadily deplete their living space; they impose on small communities the same living style irrespective of local conditions, steadily increasing urban sprawl or wasteland around them. Urban youth is more concerned with virtual reality or colonization of other planets. Vacant wasteland cannot be used as a resource for sustainable development. This kind of development increases the prospects of stress for uprooted populations. A solution should be sought within the family home development, progress within the local community.[1] Family homes and the household economy used to survive and prosper thanks to better adaptation to the environment, improving tools and land use. This has made progress sustainable, in a natural way. Appropriate gardening and landscaping make land productive and living space an attractive place for living. Traditional or industrialized land use, left only to the uncertainties of the modern market, cannot provide a solution or prevent further degradation of the biosphere. A new approach to

[1] Oikos-eco, home, household, Greek word, is used throughout this paper as the equivalent of the family home, house with eco garden, a place of dwelling, work and recreation. Oikos is therefore the living space of the family. An appropriate size of plot enables the phasing construction, building extension and improvements, according to the occupants' needs. The occupants are not only the family members since sufficient accommodation is possible for temporary guests, tourists, or family members living elsewhere. Such a home is a the home base of the family, something between household, homestead and family mansion, eco designed within an eco-oriented settlement. *The home of four generations* is the living space required for development of the family. Based on this concept, a programme of environmental and living space planning has been elaborated by EUR, eko usmjereni razvoj, Eco Universal Revival, since 1992, and initiated by the publication of the same title, Zagreb, Croatia.

living space use is required, applying eco technologies, preferring organically and locally produced food for local consumption, maintaining cultural identity, providing education which teaches sustainable living, initiating building and planning standards that provide for family development and prosperity. Global technological achievements can blend with local culture, soil, climate and topography. This can be achieved by appropriate living space planning for sustainable development of local community and living space management at the local community level, where all aspects of human endeavour are united. Sustainable development of the local community is an appropriate test of a sustainable economy. It can limit the carcinogenic growth of cities and provide recreational space for the urban population.

The development of technology makes possible the reaffirmation of all the evolutionary and spiritual achievements of mankind at a higher level of adaptation to the environment.[2] Worldwide accessibility of information and knowledge opens up new prospects of human partnership in the co- evolution of life.[3] Life and living space are inseparable; each species is useful for the other, increasing living space for new life forms, each one better adapted to the environment. Industrial civilization is contrary to this natural law. Dogmatic protection of the environment cannot stop further degradation of biosphere and biodiversity : it keeps people out of their own living space, and prevents them from improving both land and landscape. Enriched living space and cultural heritage can give an example to be followed, can be the most valuable resource of modern community development. Priority should be given to local environment and cultured landscape by wise management.[4] Yet nomadic behaviour prevails; nomads are neither concerned with cultivation of land nor with living space improvement. Contemporary society is dominated by permanent change of dwelling, thus losing prospects for the improvement of living space unlike permanently settled populations. Each resource requires appropriate technology to be transformed into a valuable product. A place of living, worthy of being a permanent dwelling, is such a product if improved, within a cultured landscape and a protected natural environment. A holistic and multidisciplinary approach to community sustainable development is required. At present, such attention is given to the production of consumable goods among which weapons of destruction have got priority. Living space ignorance and ideologies of industrialism prevent change.

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[2] Community survival development should be a priority concern of educational policy and scientific research. For illustration of this consideration see annexed figure I.

[3] The co-evolution of species is well documented. The author of this paper shares the viewpoint presented in : The Covenant of the Wild: **Why Animals Choose Domestication?**, Stephen Budiansky.

[4] Dubrovnik, an old Croatian town and independent city republic, is a good example of wise management of living space. The town has been built on an island linked to land and also fortified. The living space of the city, infertile karst, has been gradually transformed into gardens and fertile land. Merchant ships were required to bring fertile soil from Italy across the Adriatic See. During harvest time all inhabitants were obliged to tend their fields outside fortified walls. Yet culture flourished. This has made the city an example of valued cultural heritage of today with economic potential for development. Yet, such use of living space is not practised by technologically advanced societies nor considered profitable enough to be supported by the selfish industrial society of a modern state.

Transition to a sustainable future requires holistic living space planning and design according to principles: priority should be given to the largest development resource, from general to university education.[5]

The family home, household economy, homestead, is the building block of stable societies; it is the nursery of all development and an appropriate place for eco-entrepreneurship. A household living community,[6] comprising different age or interest groups can use common living space throughout the lifespan of individuals for different purposes: playing, learning, working, resting, recreating, recovering, without being in conflict. The eco home is a community where conflict of commons can be avoided.[7] Nowhere can land be used so extensively and economically, at the same time within the smallest area.[8] And what benefits they have being together,

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[5] An idea of *disposable housing*, to be changed a few times during an individual's life, was put forward by the Manifesto of Futuristic Architecture, 1914 (*Arts of our Century, Prentice Hall, 1989*). It seems to be followed up in the education of architects and urban planners, disregarded or dominated by politics, as evidenced by their lacking concern for local communities. Land, the place of permanent conflict of different interests would require appropriately educated and experienced professionals, who can have professional authority over mediation through a process of environmental planning and management for the benefit of local communities. The family living space has been excluded from the development policies of industrial society and neglected by economic science; the latter is concerned with raw materials for industrial production only. A holistic approach to family and community development receives far less attention than any short-lived industrial product. Care for family living space is left to the weakest participants, albeit the most numerous. Family development seems to be limited by all kinds of regulations in former communist countries; in competitive market economies the weakest participant cannot survive among corporations. Sustainable development depends on management of the environment and living space at the local level, on education of planners, designers and managers. Education for the sustainable development of a community is yet to be defined. At present, it seems to be dominated by dogmatic environmentalism, which is protection of the biosphere by keeping people out of particular environments**.**

[6] *Household*, *all the people living in the house, family and servants; domestic establishment*, World Book Dictionary, 1982. The Croatian language links family and habitation with words of the same root: *obitelj-obitavati, family* and dwelling at a particular place. The other Croatian word *porodica denotes kinship, blood relationship.* Family is derived from Latin words *familia, meaning members of the household*, and *famulus, servant*. On these grounds the family was accused of being to be the source of slavery and exploitation according to Engels (Porijeklo porodice, privatnog vlasništva i države, Stvarnost, Zagreb, 1979)

[7] The t*ragedy of the commons* is a good example of how community-owned land could deteriorate; without individual owners, common land can hardly be improved. Such has been the experience of the first settlers of colonies in America. They worked as little as possible on common land during the day, while trying to steal common harvests during the night. Such behaviour contributed to the economic collapse of communist society three centuries later.

[8] *D. Muvrin: Living Space, Sustainable Development and Application of Eco Technologies*, proceedings of a Symposium of the Academy of Technical Sciences, 2001. It is estimated that one plot of 0,5 ha can accommodate two families, older parents, younger couple and three children, altogether 7 permanent dwellers, including working space for the family and 10 apartments for tourists. Still enough space is left for recreation, kitchen, garden and fruit trees - up to 17 per member of the household on the inside plot and the same on public land outside the site. Such eco settlements provide quality of location and living. Each plot can128

exchanging pleasures with experience, recreation with visitors, growing and developing together, developing family and community coherence, good conduct, solidarity and cohesion! However, this is a question of choice. The change may not be possible before discarding the idea of *the abolition of family and private property* underlying building regulations and social policy in industrial states. The approach opposes market dogma, which prefers consumable housing for a consumable family[9] based on *dwelling reserves,* in order to place labour, the modern equivalent of slavery, at all times at the disposal of the market. The consumable character of the place of living is followed by the consumable character of the family, and eventually by the degradation of community, morality and environment. A depopulated living space that is devoid of responsible holders and beneficiaries is a useless resource for sustainable development, A community devoid of moral responsibility can neither be responsible for future generations nor for biodiversity. That's why protection of the environment and revitalization of the place of living should commence at the level of the home, family living space, the eco home, oikos of survival. This is possible by appropriate eco design and space planning.

2. Conceptualisation of Sustainable Development

Sustainable development can be conceptualised by deduction from general principles: a) living space is the largest development resource if inhabited by cultivators and beneficiaries of land, of which the local family is the largest in numbers; b) human habitat – *eco, oikos*, is inseparable from the environment, making experience of nature and effective responsibility towards the environment possible; c) responsibility assumes understanding of the proper human role in, and appreciation of, the co-evolution of the living world, interdependence and cooperation among species; d) responsible behaviour is expressed by wise management of the common living space, first of all by appropriate management of the human habitation at the level of community territory; f) human habitat, beginning with family living space – *home-oikos (eco)* of development and survival - is therefore a priority issue of sustainable development to commence with; g) family home-*oikos* is the place of reconciliation and unity of the economy (*eco, home+nemein, manage*) and ecology (*eco, home+logy, study, discourse*).

Living space is the only development resource for a major part of humanity, and by far the largest numbers of communities. It was always so. There is no need for colonization of other planets. Appropriate use of living space is a priority question of family survival and development. Improvement of living space, protection of biodiversity and environment is the best investment, and the largest heritage and

surrounded by hedges and shrubs in addition to trees on public land of the Eco Park consisting of the same area outside the site. It is calculated that only about 6% of the total territory of Croatia is required for the housing of more than half of the present population at eco settlements around the countryside according to eco principles. (Population density in Croatia is 84.6 per sq.km.according to the census of 1991, Statistical Year Book, 1995, Zagreb)

[9] *D. Muvrin: Tourism, Environment and Cultural Diversity, Space and Identity Aspect of Sustainable Development*, 12th ELRA Congress, Cultural Events & Leisure Systems, Sense of identity and sense of space, 2001, Amsterdam.

capital that can be handed over to posterity. This is a prospective approach to sustainable future. Living space is a development resource that can increase in value by appropriate use; it is, at the same time, a natural resource and product of the most complex interdisciplinary work. Careful planning and design are necessary, a process that modern society applies in production of consumables or useless weaponry, both of which contribute to the degradation of the environment. Living space ignorance and illiteracy have yet to be conquered; they stem from disregard for family living space and community development. It is assumed that sustainable development should be focused on the local family development on its living space. The family home, homestead of different occupations and eco entrepreneurship is what oikos, eco means.

Oikos, eco, home of family development and survival requires reaffirmation of its original meaning; it includes a sustainable life style in conformity with natural laws. Family living space, housing and land that belong to it, should be the focus of sustainable management of the environment, along with protection of biodiversity and cultural diversity. This differs from the model that totalitarian states imposed on individuals and society.[10] This model has been defined, in a dogmatic way, in the middle of the 19th century and accepted as a programme for urban planning and land use by communist states of the 20th century. They are sill valid today. . The objective has been the improvement of housing standards of the working class in industrial cities. The state was supposed to take care of the family, replacing its function, extending from child upbringing to care for the elderly. It seems that the model defined by the founding fathers of communism has been extended worldwide for urban planning, including small settlements irrespective of their size. Land has been divided up for different uses, and families have been dispersed to many places. The outcome of urbanisation has been different in countries where the state abolished private ownership; the rural land was depopulated forcibly in order to increase the working class population. Family housing zones have been considered as the greatest consumer of land and space. Family housing has been hardly tolerated by the communist state,[11] while the middle class of developed countries got free access to better housing sites according to income; this has helped reduce the gap between urban and rural areas. Unprofitable rural land is abandoned and wasteland is on the

[10] The present model of family life can be traced to an idea of *abolition of family and private property* declared by the Communist Manifesto, 1848; the idea coincided with the abolition of slavery in USA. The concept influenced state policy towards land use and probably modern dogmatic environmentalism. Socialist revolutions forced realisation of the idea; family and community have been uprooted from the organic soil of development and survival. Communist states compensated the family with all sorts of social policies trying to care for individuals throughout life. Restrictive building regulations serve the purpose. Vital soil of human reproduction and morality, solidarity, good custom and habits have been destroyed accordingly; they have not been recovered yet. Abolition of the family can be found in dogmatic environmentalism keeping people out their environment in order to protect endangered species, irrespective of the fact that about 70% of species may disappear with depopulation of rural land, as estimated by a Croatian mountain ecologist (Kranjčar).

[11] Communist Romania forced farmers into apartment houses, according to prescriptions for agricultural workers. (Engels: Principles of Communism, 1847)

increase everywhere, while an increasing part of the population lost living space needed for survival at a time when states were less able to provide for the young, unemployed, disabled and elderly.

The family is an irreplaceable building block of every society. Social anthropologists have engaged in very much faultfinding regarding the family, in a way very close to the criticism of bourgeois families by communist ideology. Yet they recognize that the family is the best possible social group in nature.[12] American architect F.L. Wright strongly felt the importance of the household community, the unity of man with nature, and he organised an educational programme for architects according to this belief.[13] Christian monasteries used to replicate family household cohesion and solidarity on spiritual grounds, while Buddhism and the guru system of Hinduism did the same with education. This may suggest that the family is first and foremost a spiritualised social living group bound by biology, emotion and common living space. If only economic interests prevail, then family functions can be rationalized, state institutions taking care of employment, children and the elderly.[14] Disintegration of the family and its living space is a consequence, while there are increasing prospects for stressful and sick individuals and societies.[15] There are few benefits of a material nature which might be justified; a much greater social loss is evident, ecological, social and moral. Uprooted, disabled and manipulated, the family and its dispersed individuals cannot be custodians of the environment. They lose interest in the land to which they were linked, and the earlier feeling of unity with nature. With the loss of a living place, doors to all sorts of destruction are opened. Too much time and energy have to be spent to keep security and broken ties together. Deprived of its living space and identity, a community is bound to suffer decay or manipulation. This explains why policies of ethnic cleansing included restrictive measures regarding land use, inheritance and the home economy in order to speed up family disintegration and fostering emigration.[16] The same can be said of policies of forced industrialisation with the same consequences: depopulation of rural land and suppression of independent rural families. Living space has been taken away from the family and community. Dogmatic environmentalists may prefer such a result in the belief that biodiversity may be better protected that way. Preserving the wilderness by keeping people out deprives the community of the primal role it was destined to play

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[12] Michael Haralambos i Robin Heald: Uvod u Sociologiju (Sociology Themes and Perspectives),Zagreb, 1989

[13] Frank Lloyd Wright, the most innovative architect in the US organised the education of architects, (Taliesin Fellowship, 1911, rebuilt 1925), where students were living, studying and working at their dwellings and on their fields. The same approach had been taken by the spiritual heirs of the Bauhaus who organized a self-sufficient community of artists 1933, Black Mountain College, built by students and professors in North Carolina.

[14] As implied in the Communist Manifesto (1848), when the abolition of family and private property was declared.

[15] 'The maintenance and improvement of health should be at the centre of concern about the environment and development' is the first sentence of the Summary of Report of the WHO Commission on Health and Environment, Our planet, our health, WHO, Geneva, 1992.

[16] Philip J. Cohen: Serbia's Secret War, Texas A&M University Press, 1996.

in the co- evolution of life. Alienated management of nature can hardly be effective.[17] Responsible management of the environment begins with the management of family living space; it commences with the rehabilitation of a family habitat, home-oikos, the physical structure of the social building cell, on whose health and vitality depend the physical, mental and moral health of society. It continues with the management of community territory.

The management of nature begins with the revitalization and management of family living space, aided by environmental planning and the eco design of the family home, eko - oikos. It goes together with the planning of the eco settlement in the proper sense; it includes elements of regeneration and improvements of the home, which enable phased construction, renewal of older parts according to new needs, an organic growth of the building, which is usually not possible either on small building sites or with building regulations designed for cities' nomadic populations. We may apply Gaya's concept of a living organism [18] to the family and community living space, considering them part of a live local environment. The home of the family provides a framework for such an organism. The organism has a capacity for development that is increased by initiative, responsibility and innovation, which can give people a better understanding of the local environment they live in, and provide a real opportunity for eco entrepreneurship, which academic environmentalism cannot achieve. Experience of nature and the environment is within reach of the inhabitants, an advantage not available to urban populations. A holistic approach to the family and local community, to cultural diversity and biodiversity, uniting technology and environment, gives new perspectives to sustainable development. The quality of such a development is by far higher than the sum of isolated achievements preferred by an institutionalised approach to large-scale development. Here we see the importance of a community's sustainable development, based on appropriate education, i.e. on a new approach to research and education linking science and practice on the same ground, of which the local community and family are the best representatives and thus provide an appropriate laboratory for scientific research.[19]

The conceptualisation of sustainable development can be exemplified by an eco neighbourhood of four generations, an eco settlement pursuing the objective of community revitalisation, and can therefore realise the potential for the sustainable development of the local community. A longing for community and care in the future, inherent in every being, is expressed through care for its offspring, elderly people and living space. The functioning of the family home illustrates this concept meaningfully. The home-oikos of the living community is the best environment for child upbringing and elderly life. Such a home is the upkeeper of family and community identity, a family base for dispersed individuals and a place of recreation for urban populations longing for community. The permanent home base of the small-scale economy is the nursery of entrepreneurship, necessary for economic

[17] Stephen Budiansky: Natures Keepers, The New Science of nature management, London, 1996.

[18] James Lovelock: Taj živi planet (The Ages of Gaya), Zagreb, 1999.

[19] D. Muvrin: The Household of Four Generations- Nostalgia or the Future, Collegium Antropologicum, Zagreb, Croatia, No2/1992.

development. Continuity of living at the same location helps improve the land, irrespective of quality, which is not possible in the case of the nomadic work style; it makes possible leisure time jobs for pleasure or free time recreation. The prospects for community and family development can be increased by taking space and time into account as potential factors of development, which are now neglected by market oriented economic policies.[20] The increased free time of information age society can be usefully spent in gardening and improvement of the place of living. Appropriate living space use by a succession of generations results in a higher starting level for younger generations; in the contrasting case, each one begins anew, (later at a different location), at a lower level, without the opportunity for living space improvement. A healthy environment for a healthier society requires appropriate environmental planning, design and management of the environmental settlement, an eco park and an eco neighbourhood of four generations.

3. Eco Neighbourhood of Four Generations

The eco neighbourhood of four generations is a concept of environmental settlement and eco entrepreneurship, a modern equivalent of the role traditional rural communities used to perform. It is an appropriate place for a reconciliation of divided human nature, gathering together separated generations, family and land, uniting modern entrepreneurship with protection of the environment and biodiversity, in circumstances characteristic of information age societies, for a balanced development of urban and rural areas, interdependent cities and small rural settlements. It provides for continuity of living space use and management for the development of local families and the community, aiming towards coexistence of man and the living world. There is no more need for a concentration of blue-collar workers in large cities due to the advancement of technology. Robots are replacing human work. However, robots cannot replace humans' responsibility towards the environment or take their place either in the culture of the community or in the cultivation of living space. Quality living space experiences increase in value by longer use, by continuous input of money, time, knowledge, and love, which only the home and an appealing birthplace can generate. Here, then, is the justification of the home economy, and settlements served by eco (home) entrepreneurship. Eco oriented settlements can be a generator of saving and recycling at the local level; it can rationalize natural resources, energy and time better than the state or large scale management have succeeded in doing; it may have a larger capacity for a higher quality of life and better housing than crowded cities can provide. Thanks to information and communication technologies living and working at a distance is feasible and desirable. Learning, as a life-long process is possible. Likewise, participation in the social life of a wider society. More time can be spared for family and social life, culture and recreation. However, this is neither an old village nor a peasant

[20] D. Muvrin: Eko usmjereni razvoj (Eco Universal Revival): koncepcija i strategija razvoja lokalne zajednice ekološki kriteriji (Concept and Strategy of Development of Local Community, eco criteria), Hrvatsko društvo za sustave i Hrvatska akademija tehničkih znanosti (Croatian Academy of Technical Scienses) , Zbornik savjetovanja Stvaranje stabilnog, prilagodljivog i životno sposobnog hrvatskog gospodarstva. Zagreb, 1995.

household. Eco oriented settlement assumes the planning of rural environments and management of land use, based on eco design and purposeful organisation. In an age of fast change and *job destruction,*[21] which follow the fast development of technology and information communication technologies, the permanent home base of the family provides better prospects for development and security in the world of increased violence and insecurity.

A programme for eco settlement should integrate the protection of the environment and the development of small communities. Integrated environmental planning at the local level is required, including all forests in the community territory, agricultural land and building land. Eco settlement is an example of such integration: unprofitable forest can be planned as a cultured landscape segment of the eco park, while useless agricultural land happens to be an attractive place of recreation for pleasure or for organic gardening. Planning the eco settlement is thus the first step towards a sustainable future. Better use of living space by holistic planning and a sustainable living style are necessary; they contain elements of self-sufficiency and self-employment, which characterized traditional society. They can be linked with contemporary knowledge and technology in the production of organic food and in eco entrepreneurship, recreation and culture, within attractively designed, planned and maintained living spaces. Living space planning and the designing of sustainable development for the benefit of the community is a priority. It is not yet known at the level of the community; it is neglected by institutions of the state, education and land management, which disregard all that is of a permanent nature, in spite of the teaching of cultural heritage care by successful communities of the past. Yet it is this heritage that underpins the contemporary development of tourism. This heritage can be an inspiring example.

Conclusion

Sustainable development and habitation[22] are closely connected with land use and living space management. Villages or small settlements used to be an appropriate place for living; interaction among agriculture, gardening, raising livestock, and craftsmanship was simple, often within a given household or settlement. Fortification provided security. Medieval towns housed peasants, craftsmen and traders while land outside walls was a common where all inhabitants cultivated their land for the purpose of gardening. Industrialism has brought specialisation and a distinction between farmers and workers. Industrialized agriculture requires fewer hands; eventually a majority of populace is left without experience of nature and society, living fragmented lives at fragmented places. As a result of restrictive regulations, families have lost influence over their living space. They lost influence over their development and destiny. Disintegration of the family and the degradation of

[21] Green Paper, Living and Working in the Information Society; People First, final draft, EU, 1996.

[22] This paper is the fifth part of an elaboration on sustainable development and the family home; it was prepared for and presented at the 18th International Conference of Wacra Europe at Vienna-Crems, Austria, September 19-25, 2001. Observations and conclusions are based on examples in Croatia, but the same can be extended to all communities deprived of living space and professionals supposed to be educated for that purpose.

spirituality and morality have followed. Communities that survived throughout centuries on unproductive land have been doomed to perish in spite of manifold better technologies. The process continues, transforming living space into wasteland and deserts. Yet living space is a lasting development resource enjoyed by the largest number of communities. It can increase in value by appropriate use; it is, at the same time, a common space serving co- evolution, a natural resource and a product of the most complex human work, a heritage and capital stock of the greatest value that one generation can hand over as a legacy to future offspring and posterity. Therefore comprehensive living space planning for sustainable development is necessary, beginning with research and appropriate education to overcome living space ignorance in order to make better use of living space.

Eco neighbourliness and an eco neighbourhood of four generations[23] combine bioethics[24] with living space management. According to the dogma of industrialism, which pervades economic development policy, family living space is considered a consumable product. This makes the family transient, consumable in character. The temporary nature of dwelling accommodation makes neighbours strangers without interest in a common living space. Construction along with industrialized agriculture are the greatest polluters of the environment. A saving-oriented eco neighbourhood opens the way to change; it unifies working, dwelling, education, culture, recreation, and social care, satisfying human needs for nature and the longing for community in a holistic approach to community development within a protected environment and biodiversity.

The living place of the family, home, oikos is the building block of eco settlements, designed for harmony with the environment as the home base of eco entrepreneurship and promoter of social coherence and unity. Continuity of living within the native community, over many generations, keeps cultural identity rooted and boosted within the local environment. Protection of the environment cannot be achieved by excluding the family from its environment. The cohesion of the community can keep in check disruptive forces of globalisation. Saving-oriented, the stationary home is a place where new generations add on achieved quality of living space, improving land and the landscape, fostering cooperation and experience of nature, aiming at the coherence of collective consciousness. Coherent consciousness is a prerequisite for peace and health, therefore stability and progress. An eco-oriented settlement of family homes embodying diversity of occupation is an expression of the cultural, social and economic complexity of society. Traditional villages spread spontaneously without planning but respecting the spirit of the place (genius loci). Nowadays, this spontaneity is not possible due to the complexity of interests. Living space planning points to the solution respecting the same spirit. In

[23] Key words of the programme for the sustainable development of local communities enhanced by the programme EUR (Eco Universal Revival), eko usmjereni razvoj, since 1992 a project of community development proposed for the municipality of Delnice, Croatia.

[24] Jean-Jacques Blanc: Bioethism, a Universal Paradigm as Substratum to a Collective and Local Consciousness, Proceedings of the 16th Wacra conference, Verlag, Munchen, 2000. Ed. T. Ećimović, E. A. Stuhler, M. Vezjak

this way settlement and protection of the environment can be part of the same process on a higher level of advanced, harmonious and balanced global and local society.

Space planning, architectural, urban and environmental design and feasibility studies are methodologies to transform the natural environment into living space for the family and local community – a complex product of multidisciplinary work of many professions. Oikos, eco, home, family living space should have the priority attention of development policies, now given to the production of consumables or weaponry. The family home is the extended physiology of the family; the same applies to the settlement and the structural framework of the community; both cannot survive on the temporary structure of housing, being transient in character. The human habitat is an organic part of nature. Appropriate planning and design should give dignity to the family and local community, providing a foundation for a pedagogy of the earth[25]and living space management for sustainable development, sustainable communities and a sustainable future.

[25] Pedagogy of the Earth, written and edited by C. Hernandez and Rashmi Mayur, Mumbai, India, 2000

Ingeborg Bauer*

Basic Principles of the Bavarian Agricultural Policy and its Contribution to Sustainable Development

In the past 50 years, Bavaria has developed from an agricultural to a modern industrial location state. Today, Bavaria claims to be a high- tech state. However, Bavaria has taken particular care to

- Bring about structural changes in agriculture in a slow and socially acceptable manner,
- Keep real estate in private hands,
- Strengthen rural areas, and
- Maintain the cultural landscape.

Maintaining the cultural landscape is especially important because Bavaria's countryside and landscape provide greenbelt regions for city dwellers seeking leisure and recreation nearby. Moreover, Bavaria is the number one tourist state in Germany. The Alps, for instance, would lose a major part of its tourist attraction if there were not any Alpine farmers who manage range lands and use the Alpine pastures as grazing grounds.

Since the past 20 to 30 years, the agricultural sector has been faced with increasingly forceful demands to contribute to the conservation of natural resources such as soil, water, and air. In recent years, biodiversity conservation has come to the fore. These demands apart, the agricultural sector must fulfill its most important task, of producing high quality, healthy food at favorable prices.

Six major functions of such a multi-functional agricultural system can be summarized as follows:

- The production function: The Bavarian agricultural sector produces high-quality foods and valuable raw materials and resources.
- The service function: Farmers render competent services on the basis of their know-how and their equipment, e.g. in the maintenance and care of nature reserves.
- The ecological function: The Bavarian agricultural system safeguards and preserves natural resources through proper and sustainable management, and ensures the diversity of species by keeping the cultural landscape open.
- The recreational function: Through the maintenance, care, and management of the cultural landscape, farmers are creating recreational areas for metropolitan centers.

* Ingeborg Bauer, Regierungsdirektorin, Bayerisches Staatsministerium für Landwirtschaft und Forsten,. Ludwigstr. 2, D – 80539 Munich, Tel. ++49 89 2182-2391, Fax: ++49 89 2182-2714, e-mail: Ingeborg.Bauer@stmlf.bayern.de

- The location function: Agriculture is a major business in rural areas. Every eighth job in Bavaria is connected directly or indirectly with the agricultural sector.
- The value function: It is important to emphasize that the Bavarian rural agriculture contributes significantly to the German society's values and social structures, particularly in the rural areas.

Unfortunately, consumers in our country are not as willing to spend money on food as consumers did before. Isolated food scandals (e.g. BSE) caused a „flash in the pan" for a short time. Consumers bought foods which are subject to special quality controls, or organically grown products. People in the German society think food should be cheap so that the maximum amount of money could be spent on cars, traveling, and for other leisure activities. If consumers are not even willing to pay the worth of food products, they certainly can not be expected to pay for all those other services in the agricultural sector from which they do not actually benefit directly, immediately, or obviously. The German society has high expectations from the agricultural community. It expects the protection of natural resources, maintenance of the cultural landscape, and animal welfare in animal management. These services cannot be free. Therefore, state support remains the only solution.

The Bavarian Agricultural Policy works within the scope of the European Union (EU) regulations. The *Bayerische Kulturlandschaftsprogramm* [Bavarian Cultural Landscape Program] forms the core of the Bavarian Agricultural Policy. This program had to be approved by the EU headquarters in Brussels. The EU is responsible for 50% of the program. Approximately € 230 million are spent annually for this program. About 50% of the agricultural areas are supported by it. It is one of the leading agro-environmental programs in Europe.

For the Bavarian Cultural Landscape Program to be implemented, one must imagine the farmer and the state entering into a contractual partnership. The farmer agrees to comply with certain measures and the state compensates him for this. This compensation must cover the income lost due to the farmer's compliance with the measures. It may include an incentive of up to 20%. The Bavarian Cultural Landscape Program is an extensive and environment friendly agricultural program, Some of the measures which are supported by this program are:

a) Conversion of agricultural cropland to grassland.
b) Minimizing the use of mineral fertilizers and plant protection products on grassland.
c) Limiting intensive crops – such as corn and wheat in crop rotation systems.
d) Providing green strips of land along the course of surface waters to protect the water against entry of harmful effluents.

In addition, there is an extra support program for ecologically valuable areas as nature reserves. This program aims to conserve nature, whereas the Bavarian Cultural Landscape Program primarily aims to maintain land management.

Another example of the Bavarian agricultural policy's strategy for sustainable development is the allowance for disadvantaged areas and the mountain regions. This

was introduced 25 years ago. There are major obstacles to modernized, efficient agricultural management due to environmental conditions in these regions. However, agriculture in these regions maintains and preserves the cultural landscape, a cultural heritage which must be protected for coming generations. Accordingly, granting the compensation contributes effectively to income in these regions and can be considered equivalent to a payment for services rendered in the area of landscape maintenance and care.

Only an agricultural sector which has secure and satisfactory means of income and which is competitive will be able to render additional services expected by society The three pillars of sustainability are, the social factor, the ecological factor, and the economical factor. Hence, investment assistance in agriculture is considered at least as important supporting environmental services. For example, grants and lower interest rates are provided for stables, liquid manure tanks, cereal storage facilities, etc. Surely, the prosperity of the agricultural operations and training of agricultural managers is a major prerequisite.

This brings us to a very essential pillar of the Bavarian Agricultural Policy: vocational training and continuing education as well as free state advisory services for farmers. In many areas, much more headway can be made through knowledge, know-how, and human insight compared to regulatory actions and policies. It was found that private advisory services are frequently interested only in the economics and deem the society's concerns and the protection of resources to be rather unimportant. In this respect, the state advisory services have major advantages.

Bavaria is the first state in Germany to have forcefully pushed the innovative renewable resource sector and helped in strengthening it through privatization. There is an extensive network of biomass heating plants due to these efforts. Help is provided to further expand this area by means of various incentive programs and through the establishment of a *Kompetenzzentrum für Nachwachsende Rohstoffe* (Competence Center for Renewable Resources). The concept of sustainability in rural development is implemented through field amalgamation or the quid-pro-quo exchange of land and through village renewal programs. Economically optimal cleared lands are no longer established. Instead, well-structured landscapes which enable ecological balance and biological self-control are created in these micro-area regions.

The primary political goal is to ensure farmers' incomes within the concept of sustainability working with the European Union, its member states, and the other regions or countries. Responsibilities of each of the various levels must be precisely defined to ensure this. This is essential for regulating financial responsibilities.

Regional responsibility is desired. Therefore, the concept of co-financing has been introduced into the discussion about the Bavarian agricultural policy. This is warranted because of national economics, by necessary and sensible competition among the regions and the differences of the importance of multi-functional agriculture in the individual regions. Expanded co-financing could be one chance and perhaps the only chance to meet the excessive demands of new EU members and

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for organizing the enlargement of the EU in such a manner to allow it to be financed even after the year 2006.

Bavaria's position is that Europe takes complete responsibility for agriculture and the agro-market. Moreover, the EU should offer a basic payment for reasonable remuneration of public interest services and secure it in World Trade Organization (WTO) terms. The member states and regions can contribute additional components of income policies and performance remuneration to allow for sustainability and multi-functionality in their area.

The remuneration for multifunctional services by the agricultural sector should not be left up to the market forces alone because they will become it will then become even more expensive. Effective and proven economic instruments (market-regulating elements) of the Common Agricultural Policy in the EU should not be given up. Bavaria stands for a mix of agro-political instruments because –it would turn out to be cheaper than with isolated regulations, in terms of the national economy.

A few statements on the proposals for the mid-term report on the AGENDA 2000 are presented below. An in-depth analysis of these proposals is yet to be conducted.

The Bavarian Ministry for Agriculture and Forestry's request of not introducing any fundamental reforms before the year 2006 has not been met with. According to a statement, by the EU Agricultural Commissioner, Mr. Fischler, it is planned to put the reform resolutions into force already as of January 1st, 2004. The Bavarian Ministry for Agriculture and Forestry rejects this. This procedure is not reconcilable with the resolutions by the EU heads of states and governments in 1999 in line with AGENDA 2000. The resolutions at that time did not give a mandate for a fundamental reform mid-term, but only a mandate for an evaluation. Bavarian farmers need planning safety for necessary investments.

In terms of multi-functionality, the Common Agricultural Policy should be benchmarked with respect to the extent to which existing market regulations are divested of their political income functions. The greater the reduction of volume and price supported by market regulations and outside protection, the more they will lose their stabilizing effect for a multifunctional agriculture. Moreover, more direct payments will be due making them increasingly difficult to justify socio-politically. Such a policy is untenable.

Although the EU Commission did not provide any assessment of the future of the milk quota regulation, the four model calculations show that any abrupt withdrawal from volume controls is out of question due to financial implications. This is very well in line with the Ministry's position on a continuation of the quota.

The fact that the Commission is explicitly in favor of continuing direct payments is encouraging. Without such direct payments, the European multifunctional agriculture cannot keep up with the world market.

A continuation of direct payments in requires a justification. With regard to the amount of remuneration, a political consensus is needed which will take into account not only the maintenance of the cultural landscape, the natural resources, but also the social and value functions of the rurally structured agriculture in Europe.

The Commission's proposal on

- the introduction of a dynamic modulation, i.e. a reduction of direct payments (3 % per year and up to 20 % in the year 2010)
- low tax allowances (only € 5,000 for the first two farm laborers together; plus € 3,000 for any additional farm laborers),
- and a cutoff limit at € 300,000 per operation

will primarily burden medium-sized, rural family farm operations in Bavaria. Additionally, the funds are not supposed to benefit the reduction regions but rather an EU fund. We reject both propositions categorically. The money must benefit the farmers on site.

Anyone who takes multi-functionality seriously must design agro-environmental measures within the definition of a quid-pro-quo contract. They must get rid of their financial aid character and conditions for budgeting and review laws which are applicable in the area of subsidies. Acceptance will not be sufficient to achieve overall coverage for the goals and objectives that society wants. Quite contrary to popular opinion, the basic principles of social market economy must prevail here as well. The state, as the offering institution, must explore in-depth as to which level of compensation will be required to win over the agricultural sector and render the desired services.

For a monetary quantification of public interest services outside of contractual nature conservation and very specific agro-environmental measures, the Agricultural Policy must establish the level of compensation rates in a practical manner to avoid bureaucracy.

An interesting proposal which still needs to be examined in detail is to cut the link between premiums and production. This is interesting especially because of the potential administrative simplification. However, the proposal is not yet mature. It is crucial that the premium is calculated with respect to the farm operation as well as on an individual basis. It is imperative to maintain the relationship to farm management if the multifunctional services of agriculture are to be honoured and compensated.

With the enlargement of EU, Bavaria also demands a new financing model for the EU Agricultural Policy. This model will be indispensable for the expansion of co-financing by the EU member states in the area of market regulations. With much greater regionalization of the agricultural policy, the model will be able to make the enlargement affordable and give countries more leeway for regional structuring.

The concept of compensation allowance for mountain regions and disadvantaged areas will be further developed as a WTO conforming instrument which is important and efficient in terms of income policies. The aim is to make it tenable with a view of development which our agricultural sector will be facing due to the WTO and the EU Enlargement.

In Bavaria, 61 % of the agricultural areas are disadvantaged regions. Special importance is given to questions such as: "what kind of agriculture do we want?" and "what is the price we are willing to pay for it?" These questions are crucial since

...

those economically disadvantaged regions would be first to fall victim to a type of agricultural concept which is exclusively targeted on production factors apart from accompanying social, ecological and aesthetic consequences.

The Bavarian Agricultural Policy stands for further development of an agricultural policy that is oriented to practical necessities with the farm operations being the center. This will best serve and sustain our agricultural sector, rural regions, nature conservation and animal welfare, the consumers and taxpayers and the society as a whole.

Aija Melngaile*

Global Aspects of Food Chain Development

Abstract: Food issues today have acquired global dimensions and the quality of food is taken into consideration by food producers as well as consumers. Food supply chains are viewed with a long term perspective to guarantee the optimum development of the food environment with a focus on food accessibility, food availability, and food affordability.

This way of thinking is determined to find the right way of surviving in the 21st century and to achieve sustainable development as a permanent state of humankind's dynamics. The food system is a very important area for the survival of humankind, and the question must be put: "Has the globalization process impacted regional and local food systems and is such an impact good or bad for the health of society"? We should stop and think about the different aspects of food system development and evaluate potential risks and benefits and choose our concept for survival. Systems thinking is very important when nutrition of children is under consideration. We cannot ignore economic, social, political and intellectual circumstances in our surroundings. Finally, effective communication between policy makers, researchers, practitioners, teachers and schoolchildren is relevant.

The marketing concept involves potential conflicts amongst the wants, interests and long term social welfare of consumers. In general, companies that satisfy consumers' wants should act in the best long-term interests of consumers and society. Marketing activities at school should be carried out under a well-thought out philosophy of efficient, effective, and socially responsible marketing. "Humanistic" or "societal" marketing represents the required concept or business philosophy to conduct food marketing activities at school.

Keywords: food chain, marketing, risk analysis, health, children.

Introduction

Researchers recognize the important connection between a healthy diet and a child's ability to learn effectively and achieve high standards at school. Also, it is suggested that schools should ensure fundamental health experience through their own food policy. Schools as part of the community should promote safe and healthy meals to safeguard children's overall health [1].

All over the world people have become disconnected from the natural sources of food including land, growing and harvesting of raw materials and from the taste and quality of food itself. People have become passive recipients in a food production, processing, distribution, advertising, and handling and consumption chain. On the

* Aija Melngaile, University of Latvia, Faculty of Economics and Management, Institute of Marketing and Quality Management, Aspazijas blv.5, Riga, Latvia,
e-mail: aija.melngaile@pvd.gov.lv

other hand, food marketing does not consider sustainability of the current food system as well as sustainability of society in general [2].

Children today live in an environment that is vastly different from that of previous generations and are affected by environmental hazards. Developments in technology, information transfer and material goods including novel foods are the key problems of the 21st century. Pollution and environmental degradation have no regional or national borders. Contaminants are transported through many media including air, water, soil, and food throughout the world. Children are physiologically very different from adults. They are in a dynamic state of growth and their nervous, respiratory, reproductive and immune systems are not fully developed. Exposure to environmental toxins can cause adverse health effects on children.

"Community policy on environment shall aim at a high level of human health protection taking into account the diversity of situations in the various regions of the community. It shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should, as a priority, be rectified at source, and that the polluter should pay [3]."

Food marketing

The theoretical and practical solution of the nutrition problem faced by children is a significant precondition for promoting the overall health of society as a whole. Food issues today have acquired global dimensions and the quality of food is taken into consideration by food producers as well as consumers. Food supply chains are viewed with a long term perspective to guarantee the optimum development of the community food environment with a focus on food accessibility, food availability, and food affordability. Food quality is often discussed as the complex problem of food safety, food nutrition value, and food sensory properties. Food hazards have shown that the risk is multidimensional and should be considered within certain social and cultural contexts [4].

Food marketing activities at school should be carried out under a well-thought out philosophy of efficient, effective, and socially responsible marketing. Competition represents only one aspect in the school's environment in which the catering business operates. The task environment at school includes the immediate actors – food service companies, suppliers, and target customers – school children. The broad environment for the catering business consists of the demographic environment, economic environment, technological environment, political – legal environment, and socio – cultural environment in a particular country. Different environments contain forces that have a certain impact on catering business development at school. Market actors, therefore, should pay close attention to the trends and developments in these environments to establish or adjust their marketing strategies.

The nature of the food system is very complex. We should discuss its local and global dimensions, the opportunities and challenges of the food business, the economic possibilities and policy dimensions of the food chain, the nutrition and food security aspects of meal preparation and also the enjoyment of tasty food. Today we

often speak about a sustainable food system to ensure the sustainable development of society as a whole.

Precautionary actions during food production and distribution should involve a whole range of measures from assessing the risks of certain products and implementing thorough monitoring and inspection programs, and requiring the food producers to follow a particular research and marketing approach. The precaution principle should be incorporated into all three elements of risk analysis: risk assessment, risk management and risk communication [3].

Marketing-mix decisions should be made to influence four target components – product, price, place, and promotion. The four "P" elements represent the producer's and seller's view of the marketing tools available for influencing buyers. However, from a customer's point of view, each marketing tool is designed to deliver a customer benefit. It is suggested that the sellers' four "P" should correspond to the customers' four "C" – customer solution, customer cost, convenience, and communication [5]. Understanding customers' needs and wants is not always simple. For example, school children have needs that they are not fully conscious of. The question remains: What relative weight should be given to the interests of the catering enterprise, customers (school children), and society in general? An analysis of the marketing strategy at school shows us that interests are in conflict. In general, marketing at school should have a society – wide orientation.

It should be mentioned that education about hygiene and food nutrition value is a necessary life skill today and should begin at school. Educated consumers will demand higher standards and will create a climate that will force legislative and food inspection authorities as well as local food handlers and sellers at schools to meet the demands for food quality assurance.

Food standards

The Codex Alimentarius contains more than two hundred food quality standards for individual foods or groups of foods. It includes the standards for labeling, food hygiene, food additives, contaminants and toxins in food and for irradiated foods, limits for pesticides and veterinary drugs etc. that are aimed at ensuring honest practices in food production and distribution. Codex standards provide guidance in the choice of food products for consumers to safeguard their health. General principles of food hygiene apply to all foods and lay a foundation for food safety through the entire food chain from primary production to final consumption, highlighting the hygiene controls required at each stage [6].

According to the 1993 FAO Expert Consultation on the Integration of Consumer Interests in Food Control, the following food issues are of particular concern to consumers [7]:

- Standards – food must be produced under certain standards of good hygiene practice and good manufacturing practice to avoid food that spoils or does not meet expectations in taste, aroma, and palatability;

- Nutritional quality – food must be free of adulterations that deprive consumers of the full nutritional value of food; food items must have adequate nutrition information on labeling;
- Food control processes – food control regulations must be applied effectively for developing self- control systems according to HACCP principles, and the state's food inspection must ensure both horizontal and vertical food control mechanisms;
- Information – government and industry must provide clear, reliable and not-conflicting information on food issues to enable consumers to make an informed choice; labels on food must have easy-to-read information;
- Environmental contamination – consumers must be aware that environmental contamination during various stages of the food supply chain is possible. Harvesting, production, processing, storage, distribution should be controlled effectively by food control services to provide the necessary protection;
- Irradiation and biotechnology – consumers must have adequate information to have confidence in food production processes using new technologies.

In the course of conversion to a marketing orientation, a company faces three hurdles: organized resistance, slow learning, and fast forgetting [5]. Resistance is especially strong in spheres where marketing is being introduced for the first time, as in the case of Latvian schools. School food services at Latvian schools traditionally belonged to schools and represented enterprises of local municipalities in the years of the Soviet Union. Today, there are two types of catering businesses in schools. Many schools still have their own food service units, and there are schools where private food service companies have begun their business [8]. Irrespective of the type of property, all school food service enterprises should establish their own marketing strategies. Learning and understanding of school children's real needs is a very serious problem. Two main directions, nutrition value and food safety, must be under consideration while developing marketing strategy at school.

In the case of private firms at school, the major objective is profit. In the case of nonprofit organizations, such as food service units at school, that belong to the municipality, the main objective is surviving and attracting enough funds to perform useful work. Nevertheless, firms should not aim only for financial benefits. They should achieve profit as a consequence of creating superior customer value by providing safe and healthy food for children at school. A company should make money by satisfying customer needs better than competitors.

The marketing concept includes an appropriate philosophy for such a delicate field of business. There is well-grounded criticism for different fast-food and low-nutritive foods sold at school. Such foods, for example, burgers, pizza, fried potatoes, different sweets and soft drinks, are tasty, widely advertised and therefore very popular among school children. Unfortunately, such food is unhealthy and can lead to serious health troubles if consumed by children everyday.

With increasing globalization of the food supply chain and with the development of new technologies in food production, risk has a multi-dimensional

nature. For example, the technological risk of GM food includes different aspects and synergistic effects of risk: environmental, health, agricultural, economic, social and ethical [3]. Within each of these categories, there are several effects to be considered – such as allergy and toxicity among health risks. The nature of the hazard may not even be fully understood in some cases and the answer to the question about an acceptable level of risk is not simple and should be determined by food experts and food policy makers. Risk analysis should be socially acceptable to consumers to ensure their confidence in food products.

The marketing concept involves potential conflicts amongst consumer wants, consumer interests, and long-term societal welfare. In general, companies that satisfy consumer wants should act in the best long-term interests of consumers and society. Marketing activities should be carried out under a well-thought out philosophy of efficient, effective, and socially responsible marketing. “Humanistic” or “societal” marketing represents the necessary concept or business philosophy to conduct marketing activities at school [5].

Precautionary approach

Risk and its acceptable level has been an important debate in management of food production so as to reach a balance between risks and benefits. Together with the emergence of new technologies, new dimensions of risk are under consideration. It is very important to use a precautionary approach in processes of risk analysis. Codex Alimentarius is currently developing an international approach for risk management, risk assessment and risk communication focused on sound science and precautionary principles. A precautionary approach is relevant in every individual food production and distribution unit especially in the school environment where health of children is under consideration [3].

The precautionary approach means that we should not wait for conclusive evidence of causes of risk before we implement control measures to protect consumers. It is very important in view of the complexity of biological systems and of interactive and cumulative impacts of potential hazards. Waiting for evidence of harm before preventive action, in many cases, can cause irreversible results not only to ecosystems and human health, but also to the economy. Short-time measures of prevention can ensure that public health is not put at risk in the long-term. Unfortunately, concerning school lunches at Latvian schools, the short-term economic objectives of catering firms have taken priority over long-term public health concerns. For example, the food safety assurance system has not been implemented in about 70% of Latvian schools today [9].

A self-control system based on HACCP systems principles is the guarantees the functioning of the precaution approach in school food services. Routine inspection data show that in about 30% to 40% of schools common bad hygiene practices are [9]:

- Cross –contamination of food due to inadequate technological flows,
- Inappropriate handling of potentially hazardous foods and ready – to- eat food,

- Inappropriate personnel hygiene,
- Lack of personnel education,
- Food from unknown sources,
- Contaminated surfaces, equipment, and
- Inadequate food handling premises.

Precautionary measures should be taken in all cases:

- Identification of potentially negative effects,
- Professional evaluation of risks and
- Professional uncertainty.

With respect to developing the food environment at school, the highest priority should be given to children's long-term health interests. Each school should establish its individual food policy, setting general standards for food production and distribution processes based on the state's overall guidelines for food nutrition value and safety. Every school should ensure that children receive food products that are of acceptable nutritional quality, are safe, and do not present health hazards. The provision of essential nutrient composition and quality should ensure that children receive the necessary nutritional elements essential for their growth and intellectual development. The provisions concerning hygiene requirements, food additives and contaminants, as well as food labeling and traceability should be aimed at protecting the health of children.

Conclusion

Food supply chains should be viewed with a long term perspective to guarantee the optimum development of the community. With increasing globalization of the food supply chain and with the development of new food production technologies, risk has a multi-dimensional nature today. A number of factors are involved and interact to form a food system that has a serious impact on public health. To create a sustainable food system, different fields of science should be considered – agriculture science, veterinary science, nutrition science, medicine, sanitary, economics, sociology, education and philosophy. Innovative systems thinking is relevant to move forward in the era of globalization.

The marketing concept involves potential conflicts amongst consumer wants, interests, and long-term societal welfare. The precautionary approach is relevant for every food production and distribution unit especially in the school environment where health of children is under consideration. Food marketing activities should be carried out under a well-thought out philosophy of efficient, effective, and socially responsible marketing.

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Richard J. Bartak*

Evaluating the Use of Raw Materials for Food Production from Economic, Ecological, Ethical and Social Points of View

Keywords: vegetarianism, veganism, protein price, intensive agricultural production, environmental pollution, human aggressivity

Abstract: In the introduction, the raw materials for food production are categorized by origin. The sections that follow demonstrate that, compared with food production of plant origin, food production of animal origin is characterised economically by low effectiveness, high demands on land resources, and heavy protein losses. A comparison of the cost of various forms of protein production in Czechoslovakia in 1989 and in the Czech Republic in 2000 shows that legumes represent the cheapest source of full value proteins. Ecological analysis shows that reliance on food of animal origin is associated with widespread environmental pollution and the possible emergence and transmission of zoonoses - diseases transmitted from animals to people. Methods of ecological agriculture can only partially solve these problems. Ethical criteria are also of crucial importance because when we reduce food production of animal origin, which necessarily causes suffering to animals, we also increase our capacity to solve the problems of hunger, malnutrition and disease. The social consequences associated with food production of animal origin manifest themselves in the increased aggressivity of individuals and of society as a whole. Abstaining from such methods would stop the killing of animals and reduce the killing of humans. The lecture is supported by the use of numerical tables and a number of well-chosen graphs and diagrams.

1. Introduction

With respect to the philosophy, as well as to the practice of vegetarianism, veganism and almost always to rational nourishment, all raw materials for food preparation (except for substances of mineral origin, which are mostly table salt and water) can be divided into three culinary groups of:

1.1 **plant origin,** which have these organs:

- vegetative (autotrophic, fotosynthetic) – the green parts, like leaves and stalks,
- generative (reproductive) - fruits of all kinds, like legumes, nuts, corns, berries, stone-fruits, pomes…,
- others (storage organisms) - roots, rootstocks, such as carrots, potatoes….

* Richard J. Bartak, B.Agr.Sc., CSc., Czech Association for Nutrition and Vegetarianism, Honourable Member of SEM Institute for Climate Change, Praha, Czech Republic, e-mail: rjbartak@ecn.cz

1.2. **animal origin,** which can be divided into
- animal bodies or their parts,
- animal products (milk, eggs…and products of these – butter, cheese…..),

1.3 Quite distinct are **higher fungi,** which are, quite rightly, no longer included in the plant or animal kingdoms, but today are a special kingdom.

From all the four points of view mentioned in the title, obtaining raw materials of plant origin for food preparation is much more efficient. Here it is neccessary, however, to mention that often these four points of view are interconnected, e.g. the **economic effects are simultaneously ecological and ethical.** The fourth point of view, **better social effectiveness,** can be added to all of the first three mentioned above.

2. Economy

The vast part of agricultural land is used for the production of plants to feed animals – however, not all animals are meant, but only those raised for meat production - they exclude dairy cows and layers (tab. 1.). 53 % of the total weight of produced cereals and pulses is used for this kind of animal fodder. This meat production wastes -

- 57 % of proteins originally contained in the cereals and pulses,
- 100 % of carbohydrates originally contained in the cereals and pulses,
- 83 % of energy originally contained in cereals and pulses.

Meanwhile, the fat originally contained in the plant fodder that is healthy, unsaturated vegetable oil, increases in the produced meat by 105 %, the result being saturated and unhealthy fat.

And this proccess requires 60 % of the general surface of agricultural land (tab 2.)!

This whole system is only the production of proteins from proteins with at least half of the original content of proteins lost!

Tab. 1
YEARLY CONSUMPTION OF CEREALS AND PULSES BY ANIMALS RAISED FOR MEAT (ČSR 1989)

		PIECES	PRODUCTION (Living weight)	CEREALS AND PULSES CONSUMPTION		
		10^3	10^3 t	kg /piece	kg / kg	10^3 t
1.	Pigs	6 743	997,4	-	3,56	3 551
2.	Piglets	7 952	-	84,8	-	674
3.	Cattle	3 270	730,1	-	2,13	1 555
4.	Broilers	24 773	262,4	-	2,55	669
						6 449

TOTAL PRODUCTION OF CEREALS AND PULSES 12 140 . 10^3 t

FOR FEEDING ANIMALS RAISED FOR MEAT 6 449 . 10^3 t i.e. 53,12 %

MEAT PRODUCTION

		PRODUCTION 10^3 t	USABLE YIELD %	CONTENT % PROTEIN	CONTENT % FAT	CONTENT % CARBO-HYDRATES	ENERGY MJ/kg	PRODUCTS 10^3 t MEAT	PRODUCTS 10^3 t PROTEIN	PRODUCTS 10^3 t FAT	PRODUCTS 10^3 t CARBO-HYDRATES	ENERGY 10^6 MJ
1.	Pigs	997,4	76	16	25	0	14	758	121,3	189,5	0	10 612
3.	Cattle	730,1	67	20	13	0	8	489,1	97,8	63,6	0	3 947
4.	Broilers	262,4	80	21	5	3	6	209,6	44,0	10,5	6,3	1 258
							?	1 456,70	307,1	263,6	6,3	15 783
								CEREALS AND PULSES				
IN CEREALS AND PULSES USED FOR FEEDING				11	2	74	14	6 449	709,4	128,9	4772,3	90 286
MEAT IN CONTRAST TO CEREALS AND PULSES				**LOSS**				10^3 t	402,3		4 766	74 503
								%	56,7		99,9	82,5
				MARGIN				10^3 t		134,7		
								%		104,5		

Then it is quite self-evident that such activities, which must be called imprudent, have negative price effects, if we compare the prices of proteins in the plant products with those in animal products (tab. 3, graph 1).

Tab. 2

ARABLE LAND TOTAL 4,862.372 HA

CEREALS AND PULSES TOTAL 2,672.523 HA
FOR FEEDING ANIMALS
RAISED FOR MEAT 53,12 % 1,419.644 HA

OTHER FODDER PLANTS 1,491.296 HA

ARABLE LAND USED FOR FEEDING ANIMALS
RAISED FOR MEAT 2,910.913 HA

FOR FEEDING ANIMALS RAISED FOR MEAT (EXCLUDING DAIRY COWS AND LAYERS), ABOUT

60 %

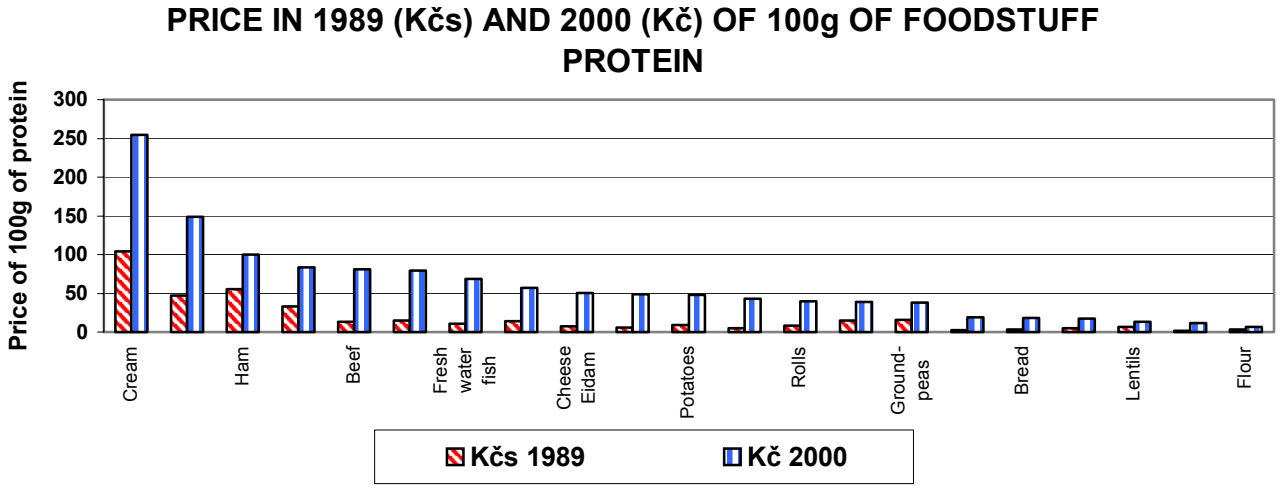
OF THE WHOLE ARABLE LAND

ARE USED.

Tab. 3
PRICES PER 100g OF FOODSTUFFS, PROTEIN CONTENT AND PRICE PER 100g OF PROTEIN IN 1989(Kč) AND 2000(Kč)

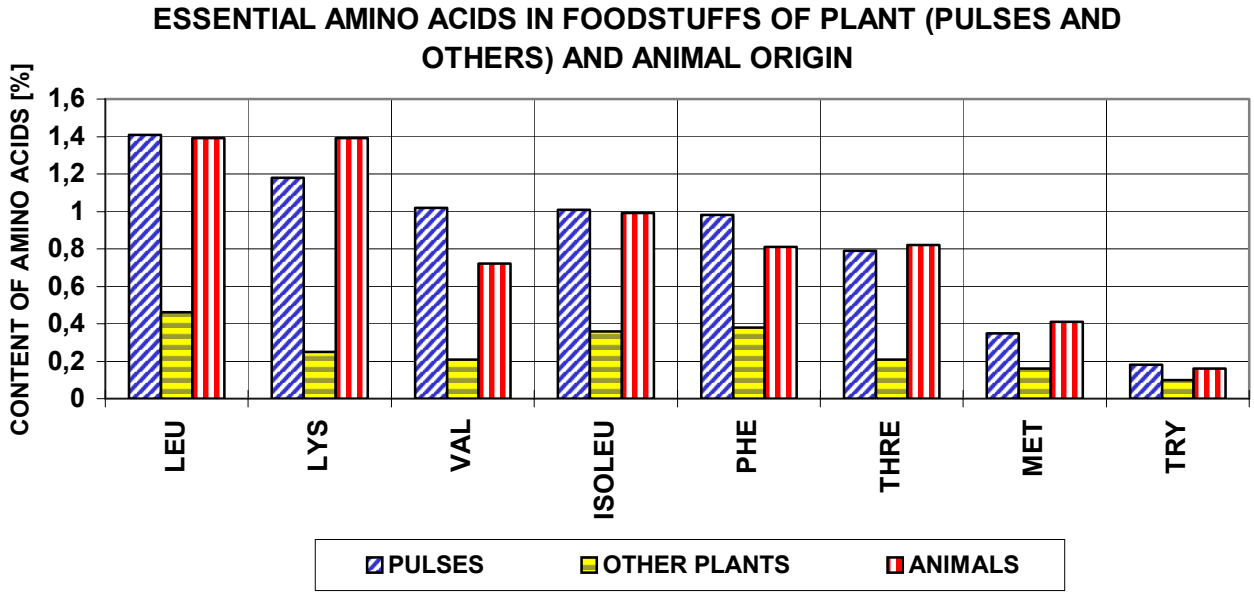
Foodstuff	Price of 100g		Protein	Price of 100g of protein	
	Kčs 1989	Kč 2000	% of weight	Kčs 1989	Kč 2000
Bread	0,26	1,50	8,2	3,2	18,5
Rolls	0,57	2,67	6,8	8,4	39,3
Flour	0,35	0,67	10,5	3,3	6,4
Potatoes	0,20	1,00	2,1	9,5	47,6
Beef	2,50	15,00	18,5	13,5	81,1
Pork	2,50	13,00	16,5	15,2	79,0
Poultry	3,00	8,00	20,6	14,6	38,9
Ham	10,00	18,00	18,0	55,6	100,0
Salami	6,00	15,00	18,0	33,3	83,3
Fresh water fish	2,00	13,00	19,0	10,5	68,3
Sea fish	2,50	10,00	17,5	14,3	57,2
Milk	0,20	1,50	3,5	5,7	48,8
Cream	2,30	5,60	2,2	104,5	254,7
Cheese	2,00	13,00	26,0	7,7	50,1
Eggs	0,60	5,60	12,8	4,6	43,0
Beans	1,05	3,70	21,3	4,9	17,3
Lentils	1,60	3,30	24,7	6,5	13,4
Soya beans	0,76	6,00	34,1	2,2	19,4
Soya flour	0,66	5,30	43,0	1,5	11,4
Ground-peas	4,00	10,00	26,2	15,3	38,2
Walnuts	7,20	22,70	14,8	47,3	149,1

Graph 1



Proteins are compared here for comprehensible reasons. Among the three main nutrients, they are the only ones that (unlike carbohydrates and fat) our bodies cannot synthesize from other nutritive substances. Proteins should be synthetized only from other proteins, indeed after being broken down into their building units – amino acids. Nine of the 22 amino acids required, so called essential (inevitable) ones, we cannot synthesize at all, but it is necessary to consume them in their original form with our food. Although contrary to what some professionals insist on, these essential amino acids are not only contained in proteins of animal origin, but also in many vegetable foodstuffs. In fact, pulses and the most perfect one of them, the soya bean, contain the best composition of all essential amino acids. The comparison of the contents of essential amino acids in foodstuffs of vegetable and animal origin is shown in graph 2. It is evident from these data that the cheaper vegetable foodstuffs are able to supply us with a sufficient amount of essential amino acids.

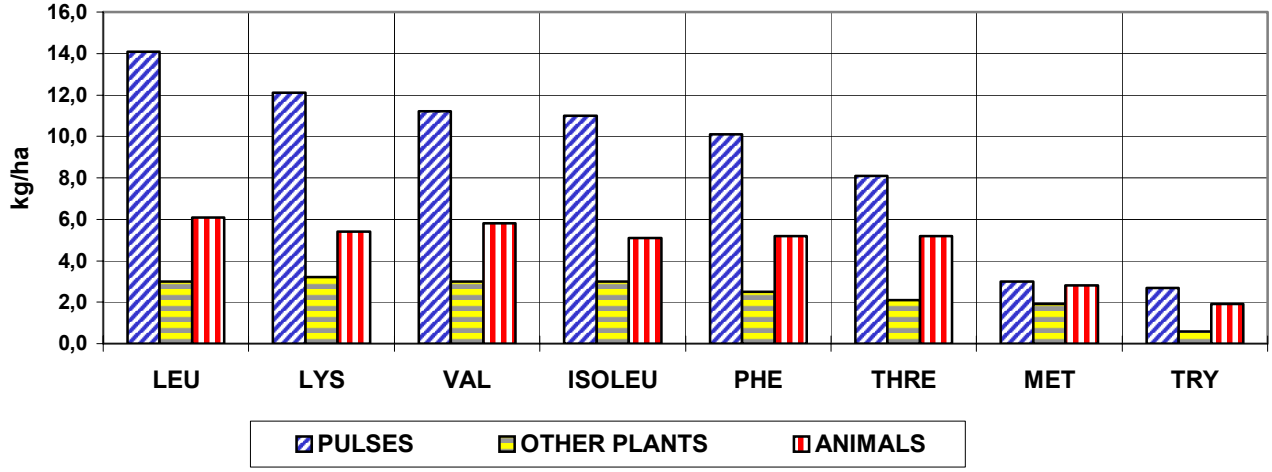
Graph 2



It is also demonstrated clearly here (graph 3) that the yields of essential amino acids from the unit surface of agricultural soil is many times higher in pulses than the yields from animal production.

Graph 3

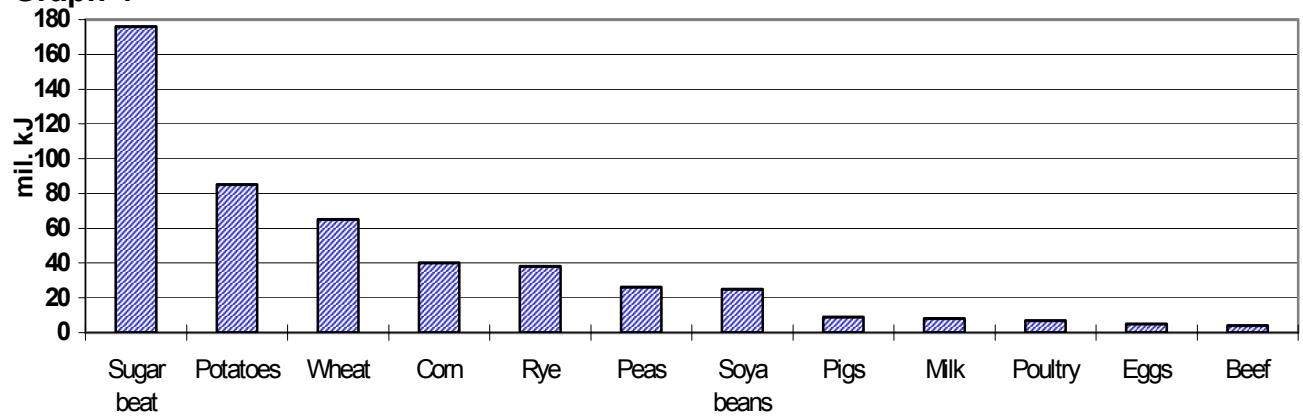
YIELD OF ESSENTIAL AMINO ACIDS FROM AGRICULTURAL LAND IN THE PRODUCTS OF PLANT (PULSES AND OTHER) AND ANIMAL ORIGIN



In the last 12 years of former Czechoslovakia and then in the Czech Republic, the price of proteins in some foodstuffs has often been changed ostensibly and illogically. However, in 1989, the prices were not real prices but irrational and artificial ones created by the state, and subsidized many times. The comparison of the price differences in this decade, shown in graph 1, is also very interesting from the rational point of view of our market system, which today classifies meat and dairy products (with exceptions that always remain cheap, such as poultry, or expensive, such as walnuts) among the most expensive sources of food protein.

ENERGY OUTPUT IN DIFFERENT PLANTS AND ANIMALS FROM ONE HECTARE OF AGRICULTURAL LAND

Graph 4

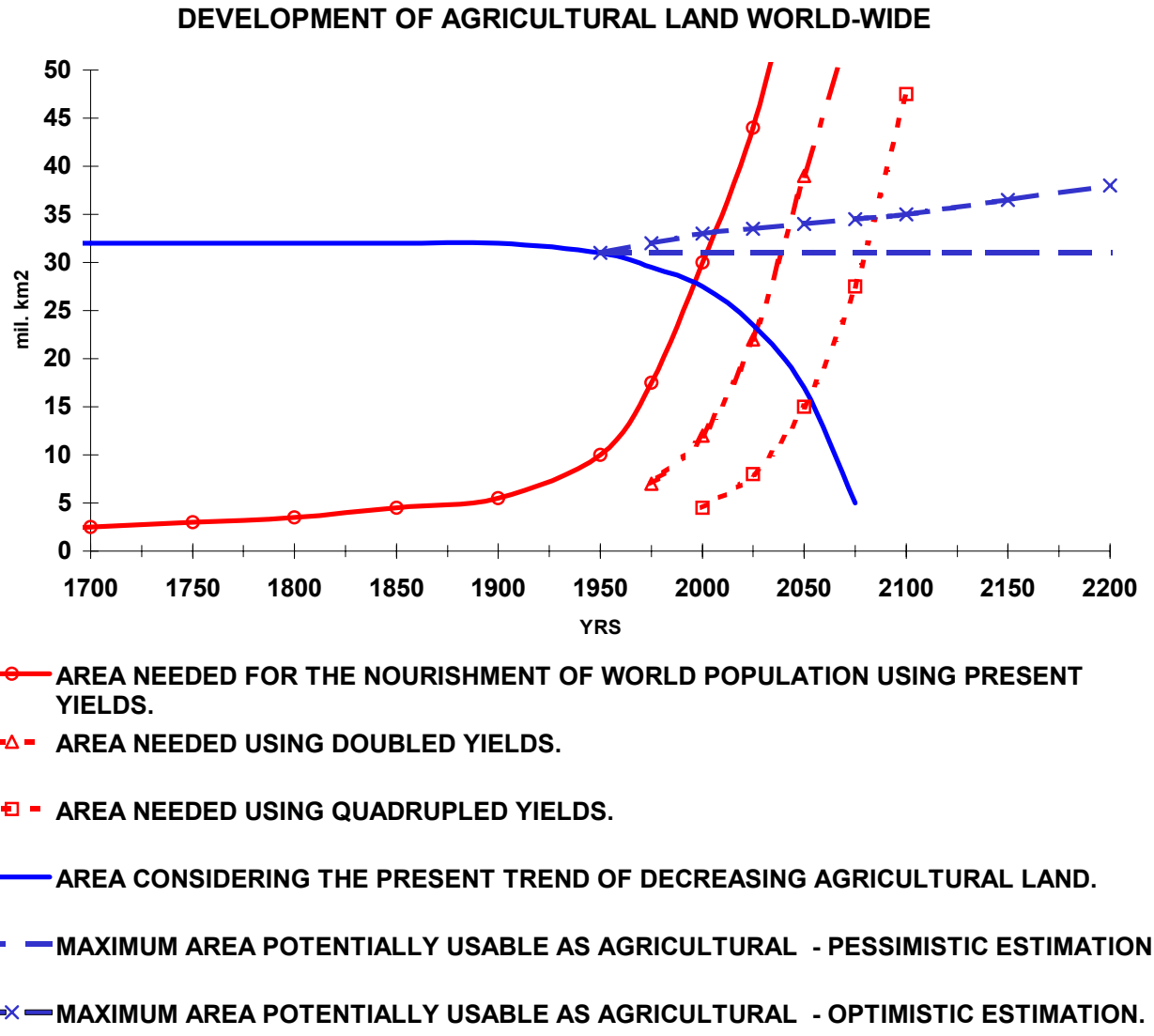


With minor shifts in sequence, the cheapest sources of proteins ten years ago remain the cheapest ones today, **certainly pulses and common flour products.** Among

pulses, the most valuable and (paradoxically!) cheapest ones are soya beans and products derived from them.

Now let us return to the data that 60 % of agricultural land is used for unprofitable production of animal proteins, which is very expensive and always accompanied by production of unhealthy saturated fat. Indeed, energy in food is crucial for our life. Let us evaluate graph 4 from this point of view, which illustrates the yield of energy per hectare of agricultural land in different plant and animal products. We are not considering the sugar beet, which has the highest energetic content, as an important foodstuff, but we can see that the **energy yield of potatoes, cereals and pulses per hectare is more than tenfold the energy yield of animal products.** In addition to issues of energy, matters involving the production of animal protein are already a clearly suicidal practice. This is evident in graph 5, which evaluates the development of the world's surface of arable soil.

Graph 5



In conclusion:

In my opinion - every creature indeed has an inalienable right to commit suicide, so does every man and, logically, so does all of mankind!

3. Ecology

Chapter 1 describes the actual but quite unnecessary intensive overproduction of plant products as a result of „intensive agricultural plant production.“ This is needed for feeding superfluous animals. Plant overproduction and especially intensive feedlots are devastating the environment quite brutally with their byproducts (wrongly named „waste“).

It is general knowledge that in the states with „intensive agricultural production“ pollution from agriculture is many times higher than the total pollution from industry and inhabitants. Agricultural pollution, however, is not as easily observed because it is spread over a larger area. But we cannot ignore it – this pollution will never disappear only with the self-cleaning effects of nature. Everything has its limits, including the abuse of natural processes.

Useless „intensive plant production“ pollutes nature mostly in the area of the hydrosphere, meaning surface waters and water underground. This intensive plant production, which leads to water and air errosion of soil, is removing the most fertile parts of agricultural land, the humus, which requires thousands and thousands of years to be created. And what is worse - this humus soil is polluting the surface water. The danger of abusing the toxic biocides (from Greek language „bios“ – life and latin „caedo“ – to destroy) – pesticides, herbicides, fungicides – is that they do not kill only the pests, but everything living. Their residues or the products of decomposing are transported not only into drinking water, but into the whole food chain with very negative health results over a long period of time, which is something we have only foggy knowledge about. They are able with their synergic, mutagenic, teratogenic aspects to influence negatively the development of many future generations. In addition, there are mineral fertilizers which also cause the pollution of foodstuffs with their well-known negative and sometimes carcinogenic influence.

Pollution from large scale animal feedlots (graph 4) is mostly very intensive, concentrated and usually with immediate short-term effects. Pollution with liquid manure is typical (especially liquid swine manure). It is a special problem for the environment and creates economic and energy problems, e.g. energy consumption in wastewater treatment plants trying to solve the problem is extremely high. Long-term negative effects for human health are indeed well-known and concern the pollution of foodstuff of animal origin with antibiotics, hormone pharmaceuticals, other harmful elements (e.g. microfungi), and zoonosis (sickness transportable from animals to humans e.g. BSE, which can be understood as nature´s punishment of humans for torturing animals who were forced into cannibalism).

The majority of these problems are solved today with the methods of ecological agriculture (syn. organic, biologic, alternative, biodynamic……) whose certified products and produced foodstuffs are coming from farmers who are not fighting with nature, but cooperating with it and the environment. Also the nutritive and health

qualities of these products are higher, as is the labour input. Only the yields are lowered. For these reasons, the price of bioproducts should be higher, too, by 130 to 300 %. These ecological systems are not solving problems of plant and animal overproduction, nor the ethical and aesthetic problems connected to the production and consumption of foodstuffs of animal origin.

In Conclusion:

In my opinion - everyone who talks of ecology and isn't vegan, or at least vegetarian, doesn't speak realistically but only cackles!

4. Ethics

Unlike chapters one and two, which can be scientifically evaluated, it is impossible to apply objective and scientific arguments here. Many statements are acceptably or unacceptably subjective, according to each person´s moral upbringing and individual opinion. Mainly, each person´s opinion depends on his evaluation of the usefulness and acceptability of abusing, torturing or murdering other creatures, particularly creatures resembling humans in their nervous systems, emotions, sensations of pain and the like. The following matter-of-fact messages are only of a sincere and informative character. Each recipient himself must evaluate them alone according to his or her opinion. The pertinent consequences of this information are already his or her personal affair, which nobody has the right to interfere with. Though it isn't clear at first view, health problems, especially those caused knowingly, should be incorporated in this chapter. An obvious ethical problem is the question of the individual´s responsibility - especially to his own descendants, and generally to all of society - responsibility of an emotional and also economic character.

It is very suitable to note the following data:

- millions of animals in the world are living in unimaginably cruel conditions of incarceration and are murdered every day not for the purpose of feeding people, but for the satisfaction of perverse human appetite
- millions of people are starving and many of them die from hunger and malnutrition, which would not be the case if millions of tons of vegetable food were not fed needlessly to animals, but rather to these suffering people
- drinking water and fossil fuel are becoming more rare over time, because they are wasted quite needlessly on large-scale animal feedlots
- millions of hectares of forests and particularly rare rainforests, which are practically unrestorable, are being razed for pastureland or to produce animal fodder
- millions of dollars (euros, crowns….) are misused for the treatment of civilization´s illnesses incurred from the consumption of animal products
- millions of people are more or less wittingly shortening their lives with heart and blood-vessel disorders developed from consumption of high-cholesterol animal foodstuffs

- millions of people are more or less wittingly shortening their lives with the development of cancers in their digestive organs, caused by the high consumption of animal products, particularly highly processed and tasty modified foods

By the way, also note that:

- about 20 million people die yearly of malnutrition who would have survived if they had had enough corn and soya beans available, which are foddered to useless animals raised for meat, and if the meat consumed in the developed states had been lowered by about 10 %
- the same area of agricultural land that can nourish one man who consumes meat and other animal products is able to nourish 12 vegetarians or 50 vegans
- overpopulation of our planet from the point of view of nourishment isn't a problem, because the Earth can easily nourish 50 billion vegetarians or 200 billion vegans
- almost all market products of milk, eggs and meat (with the exception of small quantities of bioproducts of ecological agriculture) are produced in large-scale animal production systems. There, the animals have no chance to see the sunlight for their entire lives and are then inhumanely slaughtered. The stress they experience on their journey to the slaughterhouse and when they are killed there causes the animal to emit hormones, which have considerably negative effects not only on the quality of the final food products but also on their consumers
- using the vegetarian, resp. vegan diet, can prevent many illnesses or considerably improve their condition . They include heart and blood-vessel disorders, cancers (particularly of the digestive organs, prostate and the like), gall, liver and kidney illnesses, osteoporosis, overweight and its consequences, increased blood pressure, gastric ulcers, impotence, asthma, congestion, diabetes, salmonella, gall-bladder, kidney and urinary stones……...

In conclusion:

In my opinion - it is best not to murder. And it is just as bad to murder directly with the axe as to murder indirectly by paying money.

5. Social Influence

There are several ways to define the word „social“ used in the title of this section. It can mean „connected with human society in general“ or it can mean „interpersonal relationships“ or „the improvement of common societal relationships“ .

At first sight, we might think that the aggressivity in human society is a natural phenomenon and, indeed, inevitable for human beings. It is, however, a unilateral and very narrow meaning that is often distorted because of the development of our Euro-(American-) culture and areas belonging to it. On the other continents and in other regions people have different opinions and experiences. However, it is not so significant to differ on these issues as it is to differ on human aggressivity as a whole.

Throughout human history, there have always been individuals and groups with opposing views regarding needless aggressivity. There is a nice example of this disagreement in the Greek philosophical school of Pythagoras, whose opinion on this problem was expressed well by Ovidius in Book 15 of his „Metamorphoses“, namely in the chapters „Do not eat meat“ and „Do not kill animals“.

After him, hundreds of thinkers, philosophical schools and religious movements proclaimed these or similar thoughts, usually in reference to the Lord´s law „Thou shalt not kill!“ Unfortunately, the historical development of unreasonable killing and slaughtering in the 20th century argues that society is not yet ready to advance past the damnable philosophies based on disrespect to humans, nature and life.

The deprecation of killing, slaughtering and wading in the blood of animals (which cannot be distinguished from human blood) is greatly needed, because such behavior results from a significant amount of aggressiveness. The influence of vegetarianism on society is very positive and moves in the direction of decreased aggressivity of individuals, and thus of society as a whole.

The deprecation of dishes and products prepared from dead bodies of killed animals has a demonstrably healthy and positive effect. People acting in this way are more responsible not only to themselves, but also to society as a whole. This has a clearly positive social influence.

The deprecation of the needless breeding of animals has a large social effect on individuals, because it makes them enslaved to those they have enslaved – the animals. It is the animals which every slavemaster-breeder must give his care to every day, regardless of himself, his family, his own needs, or his free time. Growing plants doesn´t require the same daily devotion of time and energy.

In conclusion:

In my opinion - human agressivity is a prehistoric relict and not only agressivity itself , but also its justification should be a crime!

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Part 5

International Agricultural Research for Development

Sabine Homann[1], Andre van Rooyen[1], Thinah Moyo[1] and Zivayi Nengomasha[2*]

Strengthening Livestock Market Flows and Feeding Practices for Improved Livelihoods in Southern Zimbabwe

1. Abstract

The growing demand for livestock products in developing countries offers income opportunities for small-scale farmers in the semi-arid areas of Zimbabwe provided they could increase off-take rates and improve animal quality. To achieve this, farmers need to increase their investments in feeding practices – but with poorly developed markets for livestock products and services, farmers have little incentive to make the necessary investments. Household surveys were conducted on goat production in six districts and on cattle production in three districts, at sites with differences in market access and human population densities. The survey examined off-take rates, management practices and socioeconomic profiles of livestock owners. In addition, focus group discussions with livestock traders provided information on market opportunities and input technologies required. Goats are an important source of cash income required for household expenses. No formal markets exist for goats, but large numbers are sold to traders and transported to urban areas. Prices are low because of a lack of market competition and poor animal condition. Cattle provide only limited income, although they are the preferred form of investment. Farmers use formal market systems in remote areas, whereas informal marketing strategies are used in areas closer to urban markets – bypassing levies and other transaction costs. Significant numbers of cattle on sale at official sales pens remain unsold – largely as a result of low prices offered by buyers due to poor animal condition or because of imperfect market situations where few buyers offer very low prices and farmers prefer to take their animals back home. The main challenges are to establish improved livestock marketing facilities and coordinated sales in rural areas and to disseminate information on prices and market requirements to small-scale producers. Premium prices paid for animals in better condition will create incentives for farmers to invest in improved animal feed and management technologies that will lead to higher production and off-take rates. The concept of market-led feeding development applies to drylands in southern Africa and will require joint investments by both private and public sectors.

* Sabine Homann[1], Andre van Rooyen[1], Thinah Moyo[1] and Zivayi Nengomasha[2]

1 International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Bulawayo, Zimbabwe;contact: s.homann@cgiar.org

2 Department of Agricultural Research and Extension (AREX), Matopos Research Station, Bulawayo, Zimbabwe; contact: ziimagadzire@mrs.gatorzw.co.uk

2. Rationale and aim of the study

Improving livestock market participation by small-scale producers is critical to achieving income growth and enhancing livelihoods in the marginal rainfall areas of Zimbabwe. Crop–livestock production systems are the most common form of land use. Livestock is regarded as a source of income, food and insurance, whereas crop production is a subsistence activity with maize, sorghum and millet being the most important crops (Ryan and Spencer, 2001). However, less than 15% of farmers in marginal rainfall areas of Zimbabwe have enough cattle to commercialize. Most farmers keep goats for immediate cash needs and home consumption (Hargreaves *et al*., 2004).

Since the early 1970s, the consumption of livestock products in developing countries has increased dramatically (Delgado *et al*., 1999). Higher demand for animal products is predicted, as human populations continue to grow and urbanization and higher living standards change consumer preferences towards more meat and milk (Tacher and Leteneur, 2000). However, trend analyses show that cattle populations are stagnant in southern Africa, but are increasing for goats. In Zimbabwe, the production of beef has declined substantially and this has contributed to a shortage in supply and higher prices (VanRooyen, 2006). Fast track land reform has caused a reduction of the commercial cattle herd by 75% from 1996 to 2004, while recurrent droughts contributed to further losses of cattle in the small-scale farming sector. However, during the same time the goat population has increased, with more than 90% of goats owned by small-scale farmers (Sibanda, 2005). Prices for goat meat are now at the same level as beef, offering opportunities for small-scale goat farmers to enter commercial markets.

In order for small-scale farmers to benefit from the market trends, incentives in the form of appropriate price–cost ratio are needed. Farmers must have better access to livestock markets and market information, as this will provide the incentive to invest in improved management. But an increase in livestock production can only be achieved through more intensive feed and forage utilization, particularly during the dry season when grazing is limited.

This paper presents the preliminary results of a study on dry season feeding of livestock in the semi-arid areas of Zimbabwe. The results will contribute to a larger regional program on livestock and livelihoods in southern Africa, funded by the Implementation and Coordination of Agricultural Research and Training (ICART), Competitive Regional Agricultural Research Fund (CRARF). The specific objectives of this study are:

- ✓ to analyze small-scale farmers' constraints and options in participating in livestock markets, and
- ✓ to determine the relationship between market access and farmers' investment in livestock.
- ✓

3. Description of the study areas

The study was conducted in the western and southern districts of Zimbabwe, which fall in agro-ecological zone IV (seasonal droughts and 450–600 mm average annual rainfall) and zone V (very erratic and less than 500 mm average annual rainfall) (Table 1). Farming systems in region IV are semi-extensive, based on crop–livestock production and have a limited potential for drought-resistant fodder crops. Cattle population densities tend to be higher here than in the drier region V. Binga (region IV) is an exceptional case with a low cattle density but very high goat density. The farming systems in region V are extensive and are based primarily on livestock production due to the highly erratic rainfalls, which limit the potential for crops.

Table 1: Characteristics of livestock production systems in the selected study districts

	Beitbridge	Gwanda	Matobo	Binga	Nkayi	Tsholotsho
Agro-ecological zone	V	V	IV and V	IV	IV	IV
Human population density (n km^{-2})*	78	118	153	117	249	181
Cattle population density (n km^{-2})**	53	62	120	77	231	139
Goat population density (n km^{-2})**	95	117	108	283	65	153
% Households with cattle	56	51	53	59	81	68
Cattle herd size (household mean, std.dev.)	5.0 (9.2)	3.4 (6.0)	4.2 (8.1)	6.6 (8.9)	6.6 (5.9)	4.4 (4.8)
Goat flock size (household mean, std.dev.)	14.2 (15.0)	14.3 (17.9)	18.5 (13.7)	12.6 (16.7)	8.8 (9.5)	6.8 (5.7)

* Source: Central Statistics Office (2002); ** Source: Department of Veterinary Services (2005).

4. Research project and activities

The research project covers a three-year period (June 2005–May 2006), implemented in the semi-arid areas of southern Zimbabwe (region IV and V); the initial results are presented here. Baseline diagnosis of goat and cattle production, management and marketing was done through household surveys, in collaboration with Agricultural Research and Extension Service (AREX), Department of Livestock Production and Development (DLPD), Desert Margins Program (DMP) and SNV (Netherlands Development Organization). Two surveys, one focusing on goat production and one on cattle production, were carried out from April to August 2005, covering the 2005/2006-production season. The data included socioeconomic aspects, herd

dynamics, livestock marketing and management (feeding, water, veterinary, breeding, housing) as well as farmers' priorities for interventions. The surveys were conducted during a post-drought period and livestock figures are therefore probably below the normal trends.

For the goat survey, six districts (Beitbridge, Gwanda, Matobo, Binga, Nkayi, Tsholotsho) with high livestock production potential and different human population densities as main determinants of land use intensification processes were selected. Within each district, two wards, one near and the other far from the main livestock markets were sampled, targeting three villages per ward. A total of 825 households were randomly selected from household lists prepared by local authorities, indicating farmers who kept at least one goat. The cattle survey covered 438 households in three of the sampled districts (Beitbridge, Nkayi, Tsholotsho). Goat keepers that also kept cattle were revisited and other randomly selected households replaced those without cattle. Data collected during the surveys were used for comprehensive analysis, using the SPSS (11.0) package.

Key informant discussions with government officials, local authorities and livestock traders and processors provided additional information to explain the goat and cattle value chain in Zimbabwe.

5. Research highlights

5.1 Livestock ownership

All households involved in the survey own at least one or two goats, but 39% of the households do not own cattle. Livestock ownership per household is generally low, with a mean of 5 cattle (std. dev. 7.4) and 13 goats (std. dev. 14.3). Livestock ownership differs between the districts. Cattle ownership is more common and median herd sizes are larger in region IV, that has a better feeding potential. However, the largest herds are found in region V, with a maximum of 51 cattle in Matobo, indicating higher heterogeneity of cattle herds in the drought-prone areas. Goat flock sizes are larger in the drier areas (region V), and Gwanda has the largest goat flock (151) in the sample districts.

5.2 Importance of livestock for small-scale farmers

Farmers ranked livestock as the most important source of on-farm income (Poster Figure 1); 65% of the farmers derive a significant share of income from livestock. Yet, farmers ranked draft power as the most important function of cattle (50.9%), followed by income (38.8%) and milk (6.4%). For goats, 62.2% of the farmers considered income as the most important function, followed by meat (25.4%) and manure (5.2%).

The two most common expenses covered by goat and cattle sales are food purchases and education (80%, Poster Figure 2). Goats particularly contribute directly to food security through meat and milk and indirectly through purchase of other food items. Goats are critically important for empowering vulnerable groups such as female and child headed households or households afflicted by HIV/AIDS or

food shortages. Small-scale farmers thus depend on cattle to sustain cropping activities, and they derive their income from goats.

5.3 Improved feeding: A key challenge for increased livestock production

Livestock production in the semi-arid areas of Zimbabwe is primarily dependent on rangelands, which are highly variable in space and time, resulting in nutritional shortages during dry seasons. Ninety-seven percent of the farmers stated that they face feed shortages for cattle production and 93% for goat production. Feed shortages commence in July, with a peak in September/October and phase out in December/January (Poster Figure 3). Although the trends are similar across all districts, the magnitude of feed shortages might be area-specific and therefore require localized feeding interventions.

Despite the importance of livestock for income generation, households' sale rates of cattle (4%) and goats (11%) are low. Only 26% of the farmers sold cattle and 44% of the farmers sold goats during the one-year observation period. Slaughter rates are also low, 1% for cattle and 7% for goats. It appears that more than 50% of all outflows are a result of mortality (26% for goats and 20% for cattle). The seasonal trend of mortality for goats and cattle are similar, with most deaths occurring from September to October, the period of feed shortages (Poster Figure 4). The study confirmed that the most critical constraint in livestock production in the region is dry season feeding.

Based on the information obtained from the surveys, strategic feeding interventions should reduce livestock deaths. Supplementary feeding should start before the animals lose body condition and continue as long as the rangelands are able to support the nutritional requirements of the animals. This could increase the number and quality of animals available for own use and sale drastically.

5.4 Market development: Driver for higher off-take and quality production

The main market destination for cattle and goats sold to urban consumers in the survey districts is Bulawayo, the second biggest city after the capital Harare (Figure 1). Fewer animals are transported to Harare, other growth points or marketed within the districts. Formal market facilities are well established for cattle. Six to eight cattle sale pens are unevenly distributed within each district. The local authorities run cattle auctions at six-week intervals. Other sale facilities for cattle are local collection points, organized by individuals and traders. Abattoirs in Bulawayo also source cattle in large quantities. The beef is then sold to urban retailers and butcheries. No formal market facilities exist for goats and most farmers rely on farm gate sales. In a few areas traders used basic holding facilities to buy goats at cattle sale pens or they communicate through the local authorities to announce their intention to purchase goats at certain collection points. Traders either sell the goats to urban butcheries that use the service slaughter facilities of few abattoirs or directly to consumers at informal peri-urban market places.

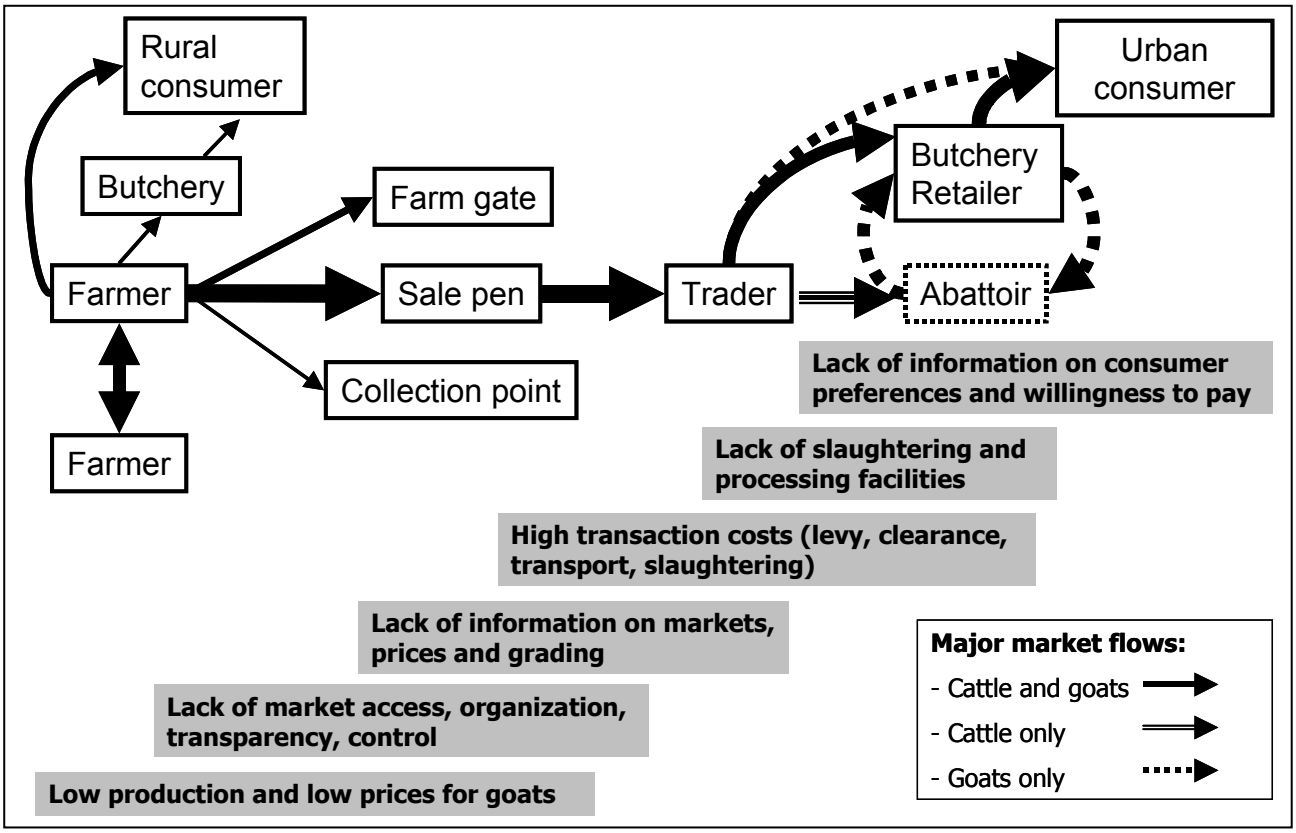

Figure 1. The market chain of cattle and goats in Zimbabwe and most critical constraints.

Discussion with livestock market participants (traders, abattoirs, butcheries, retailers) revealed major shortcomings along the value chain of cattle and goats: lack of information on consumer preferences and markets, shortage of slaughtering and processing facilities in urban and rural areas, high transaction costs and difficulties in accessing markets, ultimately resulting in low prices for the farmer. Correspondingly, farmers identified main constraints as related to market facilities (41%), difficulties in contacting buyers and lack of price information, as well as low prices (31%). But they also identified production-related constraints (29%), such as insufficient numbers and low productivity of cattle and goats, which prevent them from selling more animals.

The results of the study show that farmers attempt to use either formal or informal market strategies to their advantage. Farmers sell a substantial number of cattle at formal sale pens in remote areas, like Beitbridge, or where sale pens are well established, as in Nkayi (Table 2). They prefer informal direct sales and therefore the numbers of cattle sold at sale pens in areas closer to Bulawayo, like Tsholotsho, are low. This allows farmers to bypass marketing levies and transaction costs and puts them in a better position to compare prices and negotiate with buyers. Yet, significant numbers of cattle are yarded but not sold at cattle sale pens, either because buyers reject animals in poor condition or because farmers withdraw animals for which the prices offered by buyers are too low.

Table 2: Total number of cattle sold per district and yarded and sold at formal sale pens in sub-selected districts, 2005.

	Beitbridge	Nkayi	Tsholotsho
Total number of cattle sold per district	8422	3507	2892
Number of cattle yarded at sale pens	2993	3622	996
Number of cattle sold at sale pens	2928	2458	674

Source: Department of Veterinary Services (2005) and Rural District Councils (2005). Note that in Nkayi and Tsholotsho, sale pens were closed for four and three months respectively, because of disease outbreaks, contributing to a low number of cattle sold.

Farmers also respond positively to the accessibility of goat market facilities within districts (Table 3) – selling more goats in the wards with better market options in Gwanda, Beitbridge and Binga, than in Nkayi and Tsholotsho where no such structures exist and farm gate sales are the only other option. The number of goats sold per household is also significantly higher in the wards with better goat market facilities in Binga and Gwanda.

Table 3: Proportion of farmers who sold goats and mean sale rates by districts and wards, from May 2005 to April 2006.

Districts	Nkayi		Tsholotsho		Binga		Matobo		Gwanda		Beitbridge	
Wards	Near	Far	Near	Far	Near	Far	Near	Far	Near	Far	Near	Far
Number of farmers who sold goats (%)	52	20	36	22	63	25	58	23	76	47	64	35
Goats sold / household mean (std.dev.)	2.2 (1.6)	1.4 (1.2)	2.1 (1.2)	1.6 (0.9)	7.9 (10.3)	3.2 (3.4)	2.8 (1.9)	2.8 (3.2)	6.0 (6.4)	2.3 (1.6)	3.4 (2.6)	2.3 (1.6)

Although farmers have a basic market understanding, they do not invest in the technologies to achieve higher livestock production. For instance, there is no significant relationship between the numbers of animals sold and investments in improved feeding technologies. This leads to the conclusion that there is not yet a planned allocation of resources for the development of commercial livestock production, and thus no regular livestock supply. On the other hand, quality standards are not consistently applied and this reduces the incentive for increased investments in supplementary feeding. The potential of livestock production is therefore not sufficiently exploited. Apart from a lack of market incentives, there is also a lack of predisposition to commercialize. Farmers most often sell out of distress with livestock being considered as a financial reserve. This is aggravated by the fact that farmers lack information on market requirements, which leads to their reduced ability

to respond to market needs. A further conclusion of this study is that farmers currently invest in herd maintenance rather than commercialization.

6. The way forward

Development interventions that aim at improving livelihoods for resource-poor farmers must recognize the importance of livestock, especially goats. The key issue is to reduce livestock mortality during the dry season, in order to increase the potential for off-take and quality production. Increased benefits from livestock production through improved feeding technology need to be demonstrated under local-specific farming conditions.

The entry points for transfer of knowledge and technology development are rural livestock markets. Improving the accessibility and efficiency of livestock markets by establishing more formal market options closer to the farmers is expected to increase off-take and quality production. Through a better price–cost ratio farmers will invest more in livestock production and management, enabling higher production. A more consistent supply of goats in better conditions would reduce the transaction costs for traders, resulting in a win–win situation for farmers and traders. Commercializing farmers will be targeted for the identification, testing and dissemination of improved feed technologies. Traders will be supported in their role as providers of information and services, in areas with high potential for cattle and goat production. Facilitating farmer–trader linkages through multi-stakeholder workshops will help to define intervention priorities, enhance knowledge generation and also increase the cost effectiveness of development interventions.

The approach of market-led technology development for higher incomes of small-scale farmers will be studied in a regional program on Livestock and Livelihoods in Southern Africa (ICART/CRARF). Pilot activities will target Mozambique, Namibia and Zimbabwe, and will be implemented by a consortium of public and private partners. Lessons learned will be shared at a regional forum for judging potential transferability and wider application in other countries.

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Sabine Homann**[a], Barbara Rischkowsky[a], Jörg Steinbach[a], Michael Kirk[b*]

Towards Endogenous Development: Borana Pastoralists' Response to Environmental and Institutional Changes

Abstract**:** Pastoral rangeland management has been weakened by poorly adapted development interventions, inadequate land use policies and population growth. Ignoring pastoralists' technical and organisational capacities has contributed to progressive degradation, the erosion of social structures and poverty. Many stakeholders and scientists nowadays promote endogenous development based on pastoralists' strategies and innovative approaches. This paper explores adaptive strategies of Borana pastoralists in response to environmental and institutional change in southern Ethiopia.

The study was conducted from 2000 to 2002 in co-operation with the Borana Lowlands Pastoral Development Programme (BLPDP/GTZ). Present land use strategies and institutional networks were compared to past patterns, using participatory appraisal, official maps, GIS and household surveys. Stakeholder workshops provided a platform to identify priorities for developments with a pastoral orientation

The opening of water dams in Dida Hara in the 1970s led to a permanent use of formerly and exclusively rainy season grazing areas. While principles for water management were transferred from traditional deep wells to newly constructed dams, the scattered establishment of new encampments counteracted traditional rules. In the early 2000s, pastoralists started attempts to reorganise settlements clustering encampments in line in order to avoid further fragmentation of common grazing areas. The decrease of cattle numbers per person below the threshold of survival accelerated cropland expansion into valuable grazing areas. In response to this development, the Borana courts accepted crop cultivation as a means to cope with increasing food insecurity, but only in restricted areas. The courts also accepted cooperative grazing reserves to feed weak animals during dry season periods, but forbade individual appropriation of communal rangelands by fencing. Although indigenous institutions have lost influence and conflicts between Borana elders and local governments have occurred, in some districts joint consultations for coordinated land use were initiated.

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* Sabine Homann**[a], Barbara Rischkowsky[a], Jörg Steinbach[a],Michael Kirk[b*]

** Contact Sabine Homann, International Crop Research Institute for the semi-arid Trpics (ICRISAT), PO Box 776, Bulawayo, Zimbabwe, E-mail s.homann@cigar.org

[a] Department of Livestock Ecology, Justus-Liebig-University Giessen, Ludwigstr. 21, 35390 Giessen, Germany

[b] Institute for Co-operation in Developing Countries, Philipps-University Marburg, Am Plan 2, 35032 Marburg, Germany

These examples show that pastoral organisation has the potential to form the backbone for endogenous development. Together with external actors such as development and government agencies, pastoralists are now challenged to develop more sustainable and diverse land use strategies and redefine institutional responsibilities.

1. Introduction

Pastoralists are challenged to develop a more intensive management of the increasingly scarcer rangeland resources. Traditionally, the Borana pastoralists in Southern Ethiopia and Northern Kenya valorized semi-arid rangelands by extensive cattle keeping based on seasonal herd mobility and cooperative networks among herders. The limited supply of permanent water at clusters of deep wells in the central area enabled controlled access to the surrounding pastures.. The Borana pastoralists were thus in a favorable position to develop an exceptionally efficient system of managing natural resources, including risk mitigation and conflict solving mechanisms (Helland, 2000). However, today, Borana pastoralists are in transition, and external influences have started to shape their strategies. Greater socio-economic inequality between households and divergent trends between communities hinder cooperation in range management (Homann, 2004).

The recent changes were induced by development interventions in the 1970s, namely the construction of water ponds and the imposition of an alien administration (compare figure 1). The rapid growth of the human population, at about 2.5-3% since the late 1980s compared to 1-1.3% at the beginning of the 1970s, has severely reduced the per capita availability of the natural resources. More than 50 % of rangelands are infested by woody species encroachment and the share of land allocated to crops and private grazing is also increasing (Dalle, 2004; Kamara *et al*., 2004). Recurrent droughts aggravated the problem by causing loss of livestock and grazing resources as well as an unsustainable exploitation of the remaining resources (Coppock 1994; Helland, 2000).

This paper explores how Borana pastoralists have adapted their land use practices to these environmental and institutional changes in the past thirty years. The findings are seen as a basis for developing endogenous development strategies (www.liveinitiative.net).

2. Study location

The Borana rangelands in southern Ethiopia are characterised by an arid and semi-arid climate, with pockets of sub-humid zones. The pastures used to be considered the best rangelands in eastern Africa, and availability of water has been the key variable that determined utility of the pastures. Borana pastoralists were specialised on semi-sedentary cattle husbandry and bred the Ethiopian Boran cattle, Large East African Zebu breed. Their pastoral cattle system once achieved higher land productivity in cash and energy than extensive beef production (Cossins and Upton, 1988).

The case study included two districts. Dida Hara district represented a former rainy season grazing area where permanent water ponds were constructed in the

1970s with the aim to improve overall range use efficiency. In contrast, Web district was a traditional dry season grazing area associated with one of the oldest deep well clusters and a permanent supply of good quality water. Within both districts three encampment clusters were selected, at different distances from the respective centres.

3. Research approach

The data collection started in December 2000 at the late stage of the 1999/00 drought and was finalised in July 2002. The research methods were structured as an iterative problem solving process, starting with the pastoralists' definition of main constraints, comparing current land use with the situation 30 years ago, evaluating the applied strategies by participatory appraisals (PRA) and quantitative assessments, and searching for improvements and discussing them at several multi-stakeholder workshops.

The following sources of data were explored: A socio-economic baseline survey targeted 5 to 10% of pastoral households at each encampment cluster, with 182 households in Dida Hara and 58 households in Web. An in-depth study was carried out for a sub-sample of selected households in Dida Hara (31) and Web (29), to assess the socio-economic household characteristics and the households' mobility patterns during the last drought (1999/2001) and after the drought (2001/02). Land-use patterns and rangeland classification were assessed by key person interviews, focused group discussions, interpretation of satellite pictures (Werner *et al*., 2001) and participatory land-use mapping. Geographical Positioning Systems (GPS) measured today's area sizes and related land-use categories with the assistance of local range scouts (*aburro*). Changes in pastoralists' indigenous institutions were analysed by community focus group discussions using Venn diagrams. At the end of the research, a series of multi-stakeholder workshops was held to crosscheck the findings and to discuss priorities for future development interventions. Workshops at the community level were held in Dida Hara and Web, inviting local elders, herders and women. Workshops at the regional level were held in Yabello and Negelle, and finally at the national level in Addis Abeba, with representatives from the communities, NGOs, research, development and government organisations. About 30 to 50 participants each attended the one-day workshops.

4. Results and Discussion

4.1 Indigenous knowledge-based rangeland management

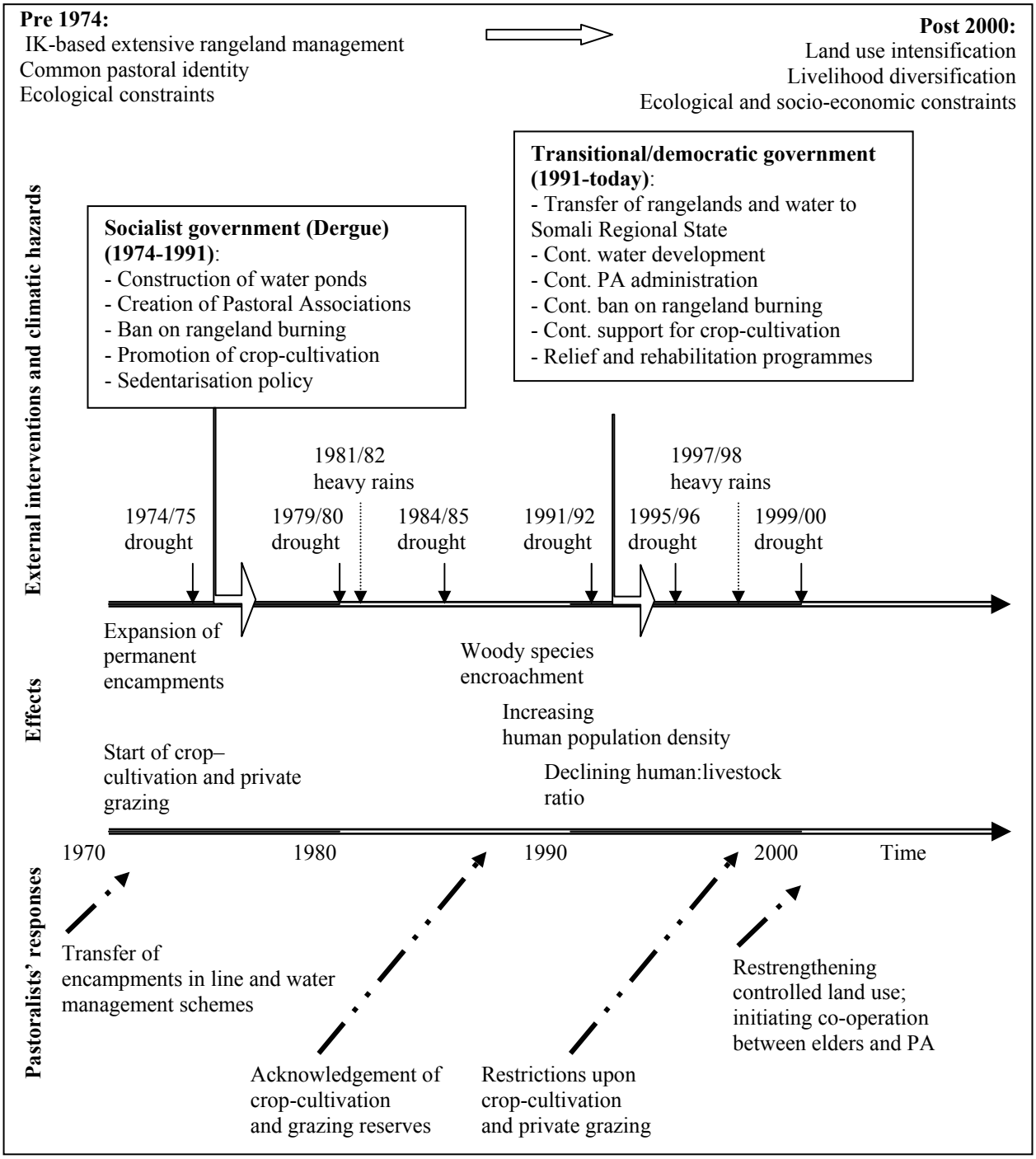
Borana pastoralists once organised the mobile range use patterns in accordance with the limited supply of water at the central deep wells. Permanent encampments were kept clustered near the wells. Herd stratification was used to tune the selective feeding behaviour and tracking potential of different cattle categories to the available grazing and water capacity. Herds of mainly lactating cows were retained on pastures adjacent to the wells (like Web). During the rainy seasons satellite herds with non-lactating cattle were split off and moved to temporary camps at more distant pastures (like Dida Hara). During the dry seasons, the lack of surface water forced the herds back to the pastures around the wells. This land use pattern produced high variability

in stocking densities across the landscape, maintaining high pasture productivity and sustaining the herds' rapid recovery from scarce grazing during dry seasons.

Strategic negotiations and flexible institutional networks facilitated the herd movements. Large groups of herders had to cooperate for watering the cattle herds, as well as for maintenance and rehabilitation of the rangeland resources. The complex arrangements for gaining access to water were institutionalised at clan level and supervised by appointed water managers (*abba herrega*). Across clans, special elders committees coordinated each well with the use of the adjacent pasture (*jarsa madda*) and other committees coordinated the access of cattle to the shared seasonal grazing areas (*jarsa dheedaa*). The decisions on large-scale movements were based on guidance by experienced range scouts and in agreement with knowledgeable elders. The communities delegated qualified and experienced members and sustained intense negotiations on claims from community members and most cases were solved immediately at the local level. More complex issues were transferred to higher levels of spatial organisation, to the clan-level or the *gumi Gaayo*, the largest assembly for governance who reviewed rules and regulations every eight years . The collaborative networks ensured a continuous transfer of information and enforcement of agreements for every member of the Borana.

4.2 Early reactions to development interventions

In the 1970s, times of the socialist government "Dergue", the construction of water ponds in traditional rainy-season pastures triggered the expansion of permanent encampments and created an imbalance between human populations, water and forage resources (compare figure 1). The imposition of a formal administration (PA) for political administration at the local level interfered with the pastoralists' co-ordination of access to grazing and water resources. Throughout the Borana encampment areas, younger community members, inexperienced in rangeland management, were appointed and given decision-making powers, whereas the Borana elders committees were excluded. The official ban on burning, sedentarisation policy and establishment of private commercial ranches further exacerbated the disruption of the Borana pastoral system. The extension services favoured crop cultivation within valuable grazing areas and claimed key resources from pastoral production. During the 1990s, times of the transitional/democratic government, the federal regionalization policy transferred an area of about one third of the Borana rangelands and two important wells to the Somali Regional State, and this fuelled inter-ethnical warfare between the two pastoral groups.



Source: Own design and adapted from Kamara *et al*. (2004).

Figure 1. Land use dynamics in pastoral systems of southern Ethiopia: External interventions, effects and pastoralists' responses to shrinkage of grazing resources.

The construction of water ponds in Dida Hara attracted wealthy owners of large mobile herds to establish permanent encampments. Areas like Web mainly remained with the smaller herd owners. The traditional functional stratification of rangelands was no longer relevant and herd mobility was reduced. The imposed PA structure further disturbed the networks by which the Borana pastoralists governed access to water and pastures. Instead, new forms of land use and more exclusive forms of land

rights emerged. Crop cultivation was introduced by foreign settlers at higher-altitude areas and was supported by governmental extension services and expanded into most valuable grazing areas mainly after the heavy drought in 1984/85 (Helland, 2000). The *gumi Gaayo* 1988 acknowledged crop cultivation as a mechanism to cope with the increasing food insecurity (Shongolo, 1995). Furthermore, Borana pastoralists adopted the fencing-off of commonly used forage-banks (*kallo*) from the neighbouring Gujji tribe, and this was certainly influenced by the establishment of governmental grazing blocks and commercial ranches. The *gumi Gaayo* in 1988 approved the development of fenced forage-banks as a tool for managing common grazing-reserves, which avoids the fragmentation of the rangelands and protects grazing for weak livestock during the most critical times of the year (Shongolo, 1995).

Two major strategic reactions of Borana pastoralists were identified, which demonstrate Borana pastoralists' ability to respond to environmental variability: firstly, the indigenous principles of clustering encampments in line (*dongora sera*) were applied to the newly obtained grazing areas in Dida Hara. The encampments were clustered in parallel direction to the gravel road from Arero to Yabello and at a 12 km distant line. Pastures between the lines were preserved for grazing of lactating herds and calves, the northern pastures for dry season grazing and the southern for rainy season grazing. The powerful herdsmen in Dida Hara were said to have enforced the directives in the new area until now. Disputes about user claims for pasturess and water were resolved by involvement of the formal administration. Clustering encampments is thus a tool by which pastoralists restrict the fragmentation of communal grazing areas. Secondly, basic principles for indigenous water management schemes were transferred from the traditional wells to the newly constructed water ponds in Dida Hara and have been sustained over the last 30 years. Access to water at wells is organised by clan-membership (*goosa*), whereas pond users are the adjacent inhabitants. The users of water from wells as well as from ponds join in assemblies for co-ordination and control (*kora ela*), and request contributions to cleaning, maintenance and rehabilitation under scrutiny of a water manager. At ponds, cattle are not allowed to enter open pond water, but drink the water hauled into troughs similar to those at the wells (*naaniga*) or where sandy soil prevails by progressively shifting spiny tree branches (*merri*). Labour invested in water management is thus a tool to control access to the surrounding pastures, with extra rights being accorded through social relationships and in case of emergency.

4.3 Adaptations to scarce grazing resources in the recent past

Within thirty years the impact of development interventions on the conditions for rangeland management became severe. Permanent encampments scattered in the former rainy season areas of Dida Hara. In Web, impoverished households settled in areas near the wells without respecting the traditional pasture regulations. It seems that separate grazing systems are evolving in Dida Hara and Web, as indicated by significant lower herd mobility after the last drought in Dida Hara ($p \leq 0.01$). The decreasing number of cattle below the threshold of survival accelerates crop cultivation in valuable grazing areas. The private appropriation of grazing areas has

also expanded, casually in the name of crop cultivation. These current land use dynamics are however inconsistent with the Borana pastoralists' strategic choices. The heavy encroachment of cropping into key grazing areas was recognized by the *gumi Gaayo* of 1996 as the primary cause for the privatisation of rangelands. Nevertheless, the earlier acceptance of crop cultivation was confirmed, but only in limited areas and subjected to the interests of pastoral land use. The private appropriation of rangelands by fencing and individual ownership of forage-banks was forbidden, but co-operative grazing reserves to feed weak animals during dry season periods were accepted (Huqqa, 1999). Yet, the directives of the *gumi Gaayo* 1996 were not fully implemented. Owners of large herds trespassed agreements through financial arrangements with the formal administration. Wars and droughts further impeded the enforcement of grazing directives. Disputes within the communities point to the dilemma of non-transparent decision-making at the local level.

Pastoral communities recently started to re-strengthen collaborative control over rangeland utilisation. Pastoralists in Dida Hara and Web have realised that their control over herd movements has largely been lost. Especially, the pastures near encampments and traditionally reserved for milking herds are endangered by over-grazing. Therefore, Borana elders initiated negotiations with the PA committees to re-establish *dongora seera,* the indigenous directives of restricted encampments. The main objective was to regain control over the access to pastures for lactating herds near the encampments, and to stop the ongoing scattering of encampments leading to fragmentation of the communal grazing areas. Linking the right of access to pastures to the location of the encampment shall enforce the accountability of households for herds and land use. Only permanent encampments, managed by at least one adult woman, and in a proper location along the line, shall be allowed to graze lactating and non-lactating animals. Forage-banks shall be restricted to areas commonly used by groups of camps and no longer be fenced privately. The fencing of cropping areas shall be limited to a maximum size of 1.5 ha per household and set up near the camps. The PA administration has been involved to enforce the decisions at the community level, despite all deficiencies and a strong distrust. The government was asked to delegate ownership of rangeland resources to the communities and to support the preservation of community-controlled grazing areas. During the research phase, it was observed that in most cases, encampments, crop cultivation fields and common grazing reserves were re-located within the agreed time frame. These findings support the hypothesis of Watson (2003) that range management committees at PA-level present a great potential to channel endogenous development.

5. Conclusions

The Borana pastoralists have shown the capability to develop adaptive management strategies to new environmental and socio-economic situations. They integrated foreign concepts of crop cultivation and exclusive grazing rights into indigenous systems of control. Their joint effort to negotiate conflicting claims with the formal administration indicates the potential of pastoralists' local strategies and institutions. To build on the Borana organisational and management initiatives, this would

however require strong external support and official recognition by the Ethiopian government.

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Sabine Homann, Barbara Rischkowsky, Jörg Steinbach*

Herd Mobility Leads the Way for Sustainable Pastoral Development: The Case of Borana Rangelands, Southern Ethiopia

Abstract**:** Insights gained from experiences in pastoral development highlight mobility as the key strategy by which pastoralists exploit heterogeneous environments in space and time. Mobility is customarily organised against the background of indigenous knowledge and local decision-making structures. Modern development concepts as well as government interventions have changed considerably over the past decades, but the impact on ecosystems and livelihood conditions remained small or even deteriorated. A new approach is needed, which utilises indigenous mobility concepts and institutional co-operation in natural resource management.

This paper develops concepts for the participatory planning of pastoral resource use on two sites in southern Ethiopia (Dida Hara and Web), which have been affected in varying degrees of intensity by government interventions, and by a higher population density. The study was conducted from September 2000 until July 2002, in co-operation with the Borana Lowlands Pastoral Development Programme (BLPDP/GTZ). Natural resources and herd movements were mapped using PRA tools, official maps and GIS. Socio-economic characteristics of 60 households and their herd movements during and after the last drought were analysed.

Herd mobility differed between the two locations: after the drought it was barely existent in Dida Hara, the location more strongly affected by development interventions, but pronounced in Web. Mobility during the drought was similar at both locations, as herd movements were driven by the crisis. The socio-economic analysis determined preconditions for applying mobility at household levels, specified for different stages of the drought cycle. The complementary analysis of pastoral organisations and institutions involved in controlling mobility revealed the existing local expertise and viable social structures, but also weaknesses in power structures and related conflicts. The results of final multi-stakeholder workshops affirmed that mobility was under-utilised.

A revitalisation of mobility should be attempted with the genuine involvement of the appropriate target groups and their experience. Scenarios of rangeland management are envisaged which operate preferably in a common property context on the larger scale of landscape. This approach integrates technical aspects of pastoral development with predictions about the household's adoption rates and viable

* Department of Livestock Ecology, Institute of Animal Breeding and Genetics, Justus-Liebig-University, Ludwigstr. 21, D-35390 Giessen, Germany;
email: Sabine.Homann@agrar.uni-giessen.de, Barbara.Rischkowsky@agrar.uni-giessen.de, Jörg.Steinbach@ agrar.uni-giessen.de

institutional arrangements, making it more tangible and target-oriented than development concepts and policies have been able to achieve so far.

Introduction

Herd mobility was traditionally practised by pastoralists as the key strategy to make use of the scattered rangeland resources on a large spatial scale (Sandford, 1983). Communal resource-tenure regimes, with their customary legitimacy, were designed for extended user groups to co-ordinate and to enforce decisions about access to shared grazing resources. The local decision-making structures were flexible to allow multiple users to negotiate on the use of key resources during times of scarcity. Pastoralists' indigenous knowledge (IK) about ecology and social organisation provided the information base for rangeland management strategies appropriate to deal with the erratic rainfalls. *Vice versa*, mobility allowed to maintain and to develop the technological as well as organisational and management IK, seeking to match the needs of the herds with the available forage and water resources (Niamir Fuller and Turner, 1999).

The Borana pastoralists in southern Ethiopia developed an exceptionally efficient system of managing natural resources. The supply of permanent water was limited to clusters of deep wells in a central area. Access to water determined the utilisation of the surrounding pastures. Herds were moved between dry and rainy season pastures. Social organisation co-ordinated and enforced decisions in rangeland management among multiple resource users. Specialised in cattle husbandry, the Borana reached an outstanding level of productivity in terms of livestock and rangeland resources (Helland, 1982; Behnke and Abel, 1996).

However, research and development interventions ignored the Borana knowledge and skills in rangeland management. Interventions aimed at increasing rangeland production started in the 1970s. Construction of watering ponds in rainy season grazing areas was intended to release grazing pressure from the dry season pastures. Instead, it opened the rainy season area up for year-round grazing and attracted uncontrolled settlement. This led to reduced mobility of the herds, causing overgrazing in the formerly seasonally used pastures. At the same time, imposition of a top-down formal administration undermined the indigenous institutions of pasture management. Another destabilising factor was the political decision of the Federal Government of Ethiopia to hand over about one third of the Borana rangelands and two important well clusters to the neighbouring Somali Administrative Region. This effectively impeded access to the most fertile pastures, destroyed reciprocal arrangements between Borana and Somali pastoral communities and fuelled ethnic conflict. The extension services favoured cultivation within valuable grazing areas and blocked herd movements. The official ban on rangeland burning and the establishment of private commercial ranches exacerbated the disruption of the Borana's traditional resource-use system (Kamara *et al*., 2004). These factors have led to a sharp decline in openly accessible Borana rangelands (Figure 1). The rapid growth of the human population (Figure 1) and recurrent droughts put further pressure on the rangelands (Helland, 2000). Already more than 40% of the area were

considered as degraded at the beginning of the 1990s and the trend seemed to continue downwards (Coppock, 1994).

The challenge for future pastoral development planning is to design practical concepts building on pastoralists' IK. The solution is not to romanticise this, but rather to support the proven practices and to redirect external interventions in order to support pastoralists' strategies in securing their livelihoods. Innovative approaches are needed to integrate indigenous and external knowledge in development planning and decision-making. Against this background, the paper explores the core question how herd mobility can be utilised to arrive at a more sustainable pastoral development process.

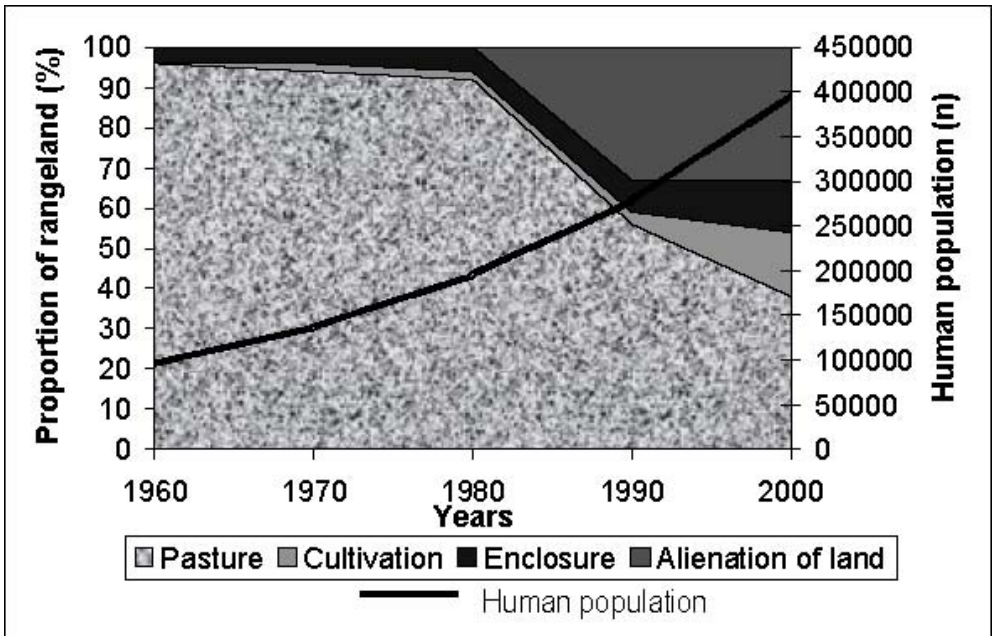


Figure 1. Projection of shrinkage of available grazing resources in Borana rangelands.

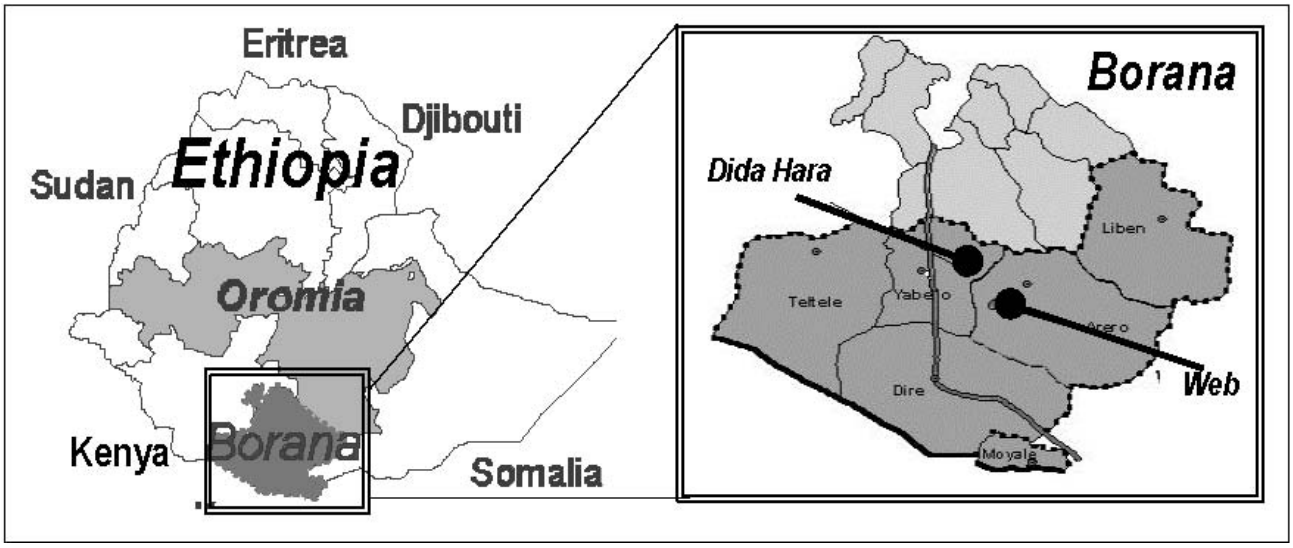
Note: The category 'pasture' represents the total remaining grazing land.

Research approach and location

The research study was planned in collaboration with the Borana Lowlands Pastoral Development Programme (BLPDP/GTZ), and was carried out from September 2000 to July 2002 (compare Homann *et al*., 2004). Incorporated into a development project, the study was expected to improve the understanding of the pastoralists' priorities, adaptations and innovative strategies, and to contribute to more genuine development concepts for pastoral management systems.

Two districts in the Borana rangelands were chosen, which differed in the functionality of the traditional system and in external interference (Map1, Map2). *Dida Hara* district was selected to represent a location with high interference from outside. The area had been traditionally used for rainy season grazing due to the only seasonally available surface water sources. The construction of permanent watering ponds in the 1970s opened up the area for year-round grazing and uncontrolled

settlement. In contrast, *Web* district represented a location with comparatively low interference. It is a traditional dry season grazing area associated with one of the deep well clusters and a permanent supply of good quality water.



Map 1. Dida Hara and Web in the Borana rangelands in southern Ethiopia.

Research process and methods

To answer the core question, the research process was structured as a stepwise approach focussing on mobility (Figure 2).

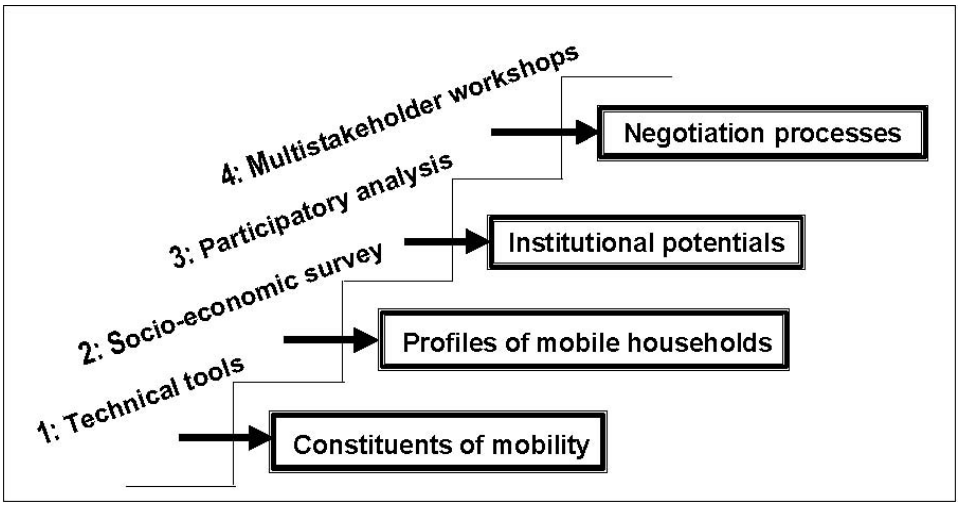


Figure 2. Stepwise approach for exploring pastoralists' IK in rangeland management strategies.

The constituents of mobility were explored starting with initial group discussions at three selected encampment clusters each in Dida Hara and Web using Participatory Rural Appraisal (PRA) techniques. On the basis of pastoralists'

rangeland classification, seasonal land-use patterns in the Borana rangelands were identified, as practised today in comparison to 30 years ago. The current land-use patterns in Dida Hara and Web were investigated by participatory land-use mapping and herd mobility calendars. Geographic Positioning Systems (GPS) and official maps were used to quantify the pastoralists' ecological rangeland classification and assess seasonal utilisation patterns.

Profiles of mobile households were determined based on a socio-economic baseline survey in 182 and 58 households from the three encampment clusters in Dida Hara and Web, respectively. The data provided basic information about the pastoral communities and local infrastructures, as census data were not available. Subsequently, a socio-economic in-depth survey was conducted with a sub-sample of 60 households. The households' herd movements during (March 1999 - February 2001) and after the last drought (March 2001 - February 2002) were recorded. A mobility index was defined by calculating the monthly walking distances of cattle, small ruminants and dromedaries. Weighing factors were applied to account for different efforts to move the different species. The aggregated distance in movements was then converted into levels of mobility (low, medium and high), determined by the mean monthly walking distances + 95% confidence interval and additionally integrating pastoralists' criteria for ranks of mobility (moving at least the cattle herd, and shifting the cattle herd at least twice). The effects of socio-economic household characteristics on mobility were tested by logistic regressions. Locally defined variables were hypothesised to influence the levels of mobility and were used as regressors.

The potential of the indigenous Borana institutions regulating natural resource management was analysed in participatory community meetings. Following the traditional rules, the elders in Dida Hara and Web were invited to delegate participants to the meetings, held at the traditional meeting places. The pastoralists were split into two groups and drew Venn Diagrams to show all institutions relevant for natural resource use - one group depicting the current institutions and the other depicting the situation before the development interventions. The groups jointly presented the completed Venn Diagrams and discussed the differences.

Key person interviews helped to understand the development and confirmed the findings of group meetings.

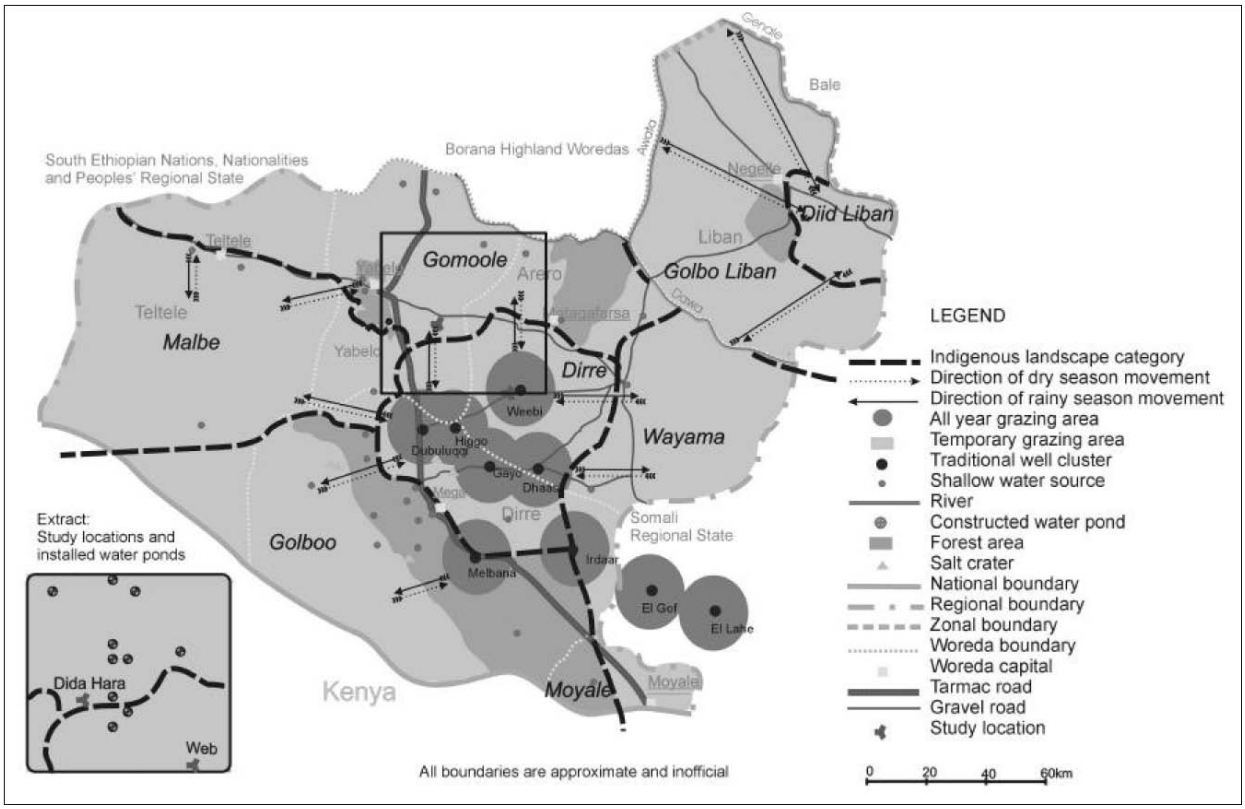
Finally, a series of multi-stakeholder workshops was organised at the end of the field research. Representatives from governmental and non-governmental research and development organisations operating in the Borana rangelands as well as from the Borana pastoral communities were invited. The first workshops were held at the level of the local communities in Dida Hara and Web. The communities were invited to delegate participants for the workshops, following the Borana custom of sending experienced elders to meetings. They were kindly asked to include women. Thereafter, workshops were held at zonal level in Negelle, capital of the Borana rangelands, at woreda-level in Yabello, seat of local development agencies, and at national level in Addis Abeba. The research findings were presented and priorities for pastorally-oriented development were explored jointly.

Results

Step 1: Identifying constituents of mobile rangeland management

Herd movements have been reduced considerably over time: 30 years ago, Borana rangeland management was organised on a large scale of landscape (Map 2). The permanent encampments were clustered near the traditional deep wells, the only permanent source of water. During rainy seasons, the pastoralists led the herds to very distant pastures in response to rainwater availability. This reduced the grazing pressure around wells. During dry seasons, the lack of surface water forced the herds back to the pastures around the wells. The milking herds were grazed throughout the year in the inner circle near the wells, and the other animals were kept in the outer circle. The herders - being in close contact with their herds, the natural environment and other herders - knew exactly where to move their animals in order to find available forage and water resources.

When the water dams were opened in the traditional rainy season location of Dida Hara (compare extract in Map 2), settlements expanded rapidly, as long-distance rainy season movements were no longer needed. Consequently, herd mobility was reduced, and differences emerged between Dida Hara and Web. A few wealthy Borana (6 % of the households) established very large herds of over 150 animals in Dida Hara, whereas most households (91 %) barely sustained their livelihoods from herds of less than 50 animals. One year after the last drought in southern Ethiopia, there were scarcely any herd movements in Dida Hara. Households co-operated much less in herding than in Web, and the formerly abundant pastures are rapidly degrading. Contrarily, mobility was still pronounced in Web, although the mobile herds from Web no longer had access to their former rainy season grazing areas and became confined to areas closer to the deep wells. The heterogeneity in herd size was smaller and most households continued to co-operate in managing their small herds. Generally, availability of water lost its function of regulating the spatial organisation of grazing. The Borana have almost ceased to distinguish between pastures for milking herds and pastures for more mobile herds. Separate grazing systems evolved in Dida Hara and Web, reinforced by different socio-economic trends.



Map 2. Indigenous land-use patterns in Borana rangelands, southern Ethiopia.

Source: Author, based on pastoralists' interpretation of satellite pictures provided by Werner *et al.* (2001).

Step 2: Determining socio-economic profiles of mobile households

During the drought, the mobility index was similar in Dida Hara and Web, as herd movements were driven by the crisis (Figure 3). The only socio-economic characteristic, which showed an effect on mobility in both locations during drought, was that households selling their animals at export markets were more mobile than the others. However, the proportion of households with high mobility was nearly double the proportion in Dida Hara.

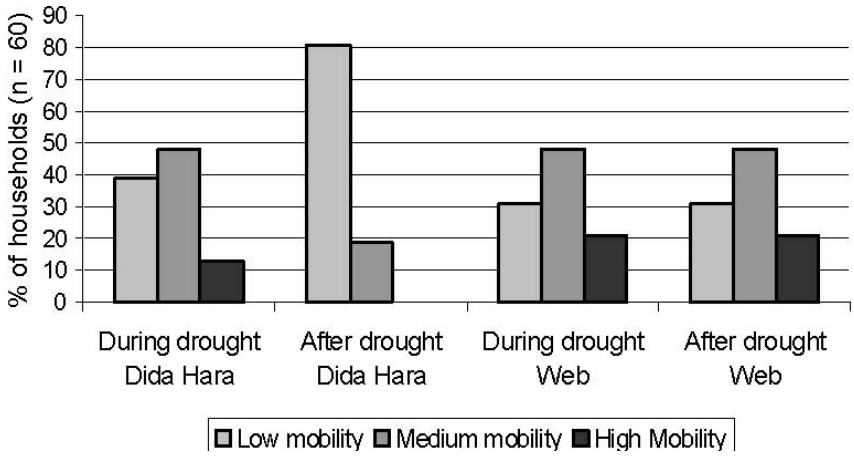


Figure 3. Proportion of Households with low, medium and high mobility in Dida Hara and Web during and after the last drought.

In the year after the drought, mobility was significantly affected by location and was higher in Web than in Dida Hara (Figure 3). No households with high mobility and only 19 % with medium mobility were found in Dida Hara, while in Web nearly half of the households exerted a medium and 21 % a high mobility. Mobility of households after the drought also increased when they were part of larger herding groups and was higher for households with enough animals to live from livestock alone. Households with camels (an adaptation in herd composition made by the Borana in response to changing rangeland conditions) were more mobile than others. More households in Web kept camels than in Dida Hara. Greater mobility was also linked to larger herd size and/or the capability of organising cooperative networks. As herds are becoming smaller and family members are forced to engage in other activities, cooperation is essential to support mobility. Therefore, it is anticipated that the ongoing socio-economic differentiation and the loss of negotiating networks and information flow will lead to further reductions in mobility.

Step 3: Exploring the development and potential of indigenous institutions

The comparison of the Venn Diagrams depicting the situation before and after development interventions had taken place, showed the changes in the organisation of access to natural resources (Figure 4). Traditionally, large-scale land-use planning was co-ordinated by complex institutional networks (Figure 4a). The right of free access to water and pastures for all Borana was regulated by trusteeships for each well held by a specific clan. Appointed supervisors handled the daily administration of the wells (*abba herrega*). Water management at clan level was supported by institutions determined by the grazing locality. Elders' committees co-ordinated the access of livestock to each well with the use of nearby pasture (*jarsa madda*). Further committees were responsible for the shared grazing areas (*jarsa dheedaa*). The responsibility for local land-use planning was conferred to sub-committees in settlement clusters (*jarsa reera*), neighbourhoods (*jarsa ardaa*) and single villages (*abba olla*). Social security, including the peaceful resolution of conflicts about resource use, was assured by local clan representatives (*jallaba, abba qaee*). Directives for good governance for the entire Borana society were supported by a complex administrative system (*abba gadda*) including a legislative assembly that reviewed existing prerogatives and obligations (*gumi Gaayo*). Special counsellors were appointed as mediators within the institutional network (*hayyu*).

The governmental introduction of local administrative units - 'Peasant Associations' (*PA*s) undermined flexible control through experienced elders (Figure 4b). Younger community members, inexperienced in pasture management and lacking IK, were appointed and given powers of decision-making at the local level. The additional transfer of authority for formal education, relief and extension to the *PA*s further undermined the authority of traditional institutions. Today, the elders' committees are no longer able to apply their knowledge. This has caused conflicts between generations and within communities. The committees for the large-scale coordination of herd movements have almost entirely lost their function. Instead, immediate-response reactions are made by the village heads and formal administration. The multiple cross-linkages of the indigenous institutions for land-use

planning to the indigenous institutions for social security have been almost completely destroyed. Mediation by the traditional governance body is now minimal.

Nevertheless, the Venn Diagrams show that - despite the erosion of most indigenous institutions - those concerned with administration of water (such as the deep wells in Web) have retained their importance. The essential principles of water management have been transferred to the newly constructed ponds in Dida Hara. To regain control over rangeland management, elders at both locations started to negotiate with the *PA* Committees to re-implement traditional directives for restricted settlement and thereby to stop the over-utilisation of the rangelands.

The analysis revealed weaknesses in power structures and related conflicts. Enforcement of decisions for using, maintaining and rehabilitating rangeland resources has been severely weakened. Shortage of pasture and water, as well as inter-ethnic conflicts, led to a disregard of directives. The deteriorating procedures for negotiation weakened the information and communication structures needed to co-ordinate herd movements in time and space. However, the diagrams also revealed the Borana's organisational expertise and still viable social structures. The current initiatives of the elders show that pastoralists can be innovative in adapting their strategies to changing conditions.

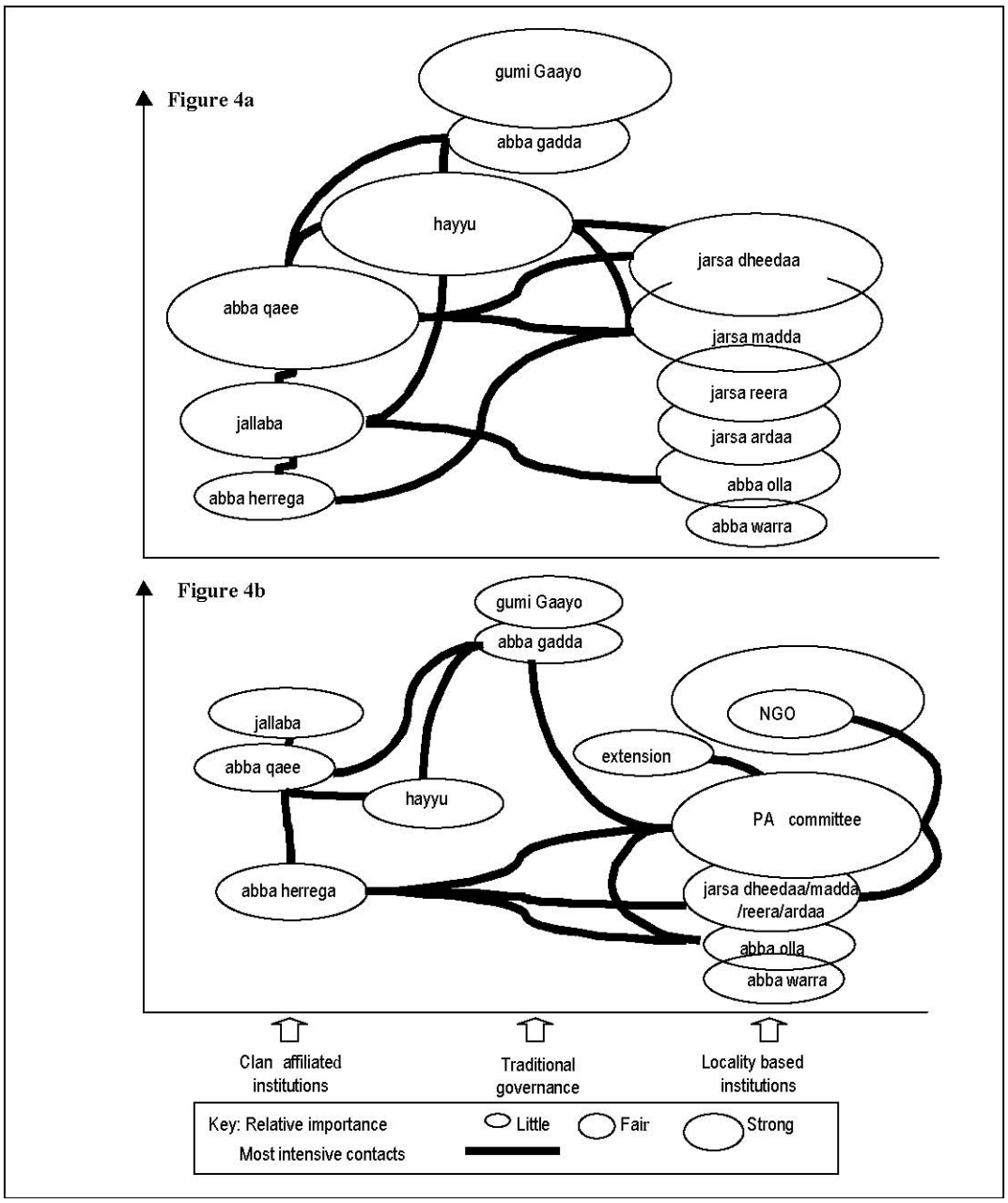


Figure 4. Simplified Venn Diagrams derived from pastoralists' design of the most relevant institutions for natural resource management in Web and Dida Hara; 4a. Indigenous institutional set-up 30 years ago; 4b. Changed institutional set-up today.

Step 4: Initiating and encouraging multi-stakeholder platforms

The participants in the multi-stakeholder workshops affirmed that pastoral IK was still needed and under-utilised. Their statements matched with the study recommendation to focus on herd mobility in order to generate concrete options for improved rangeland management. The focus on mobility helped to define institutional responsibilities such as land-use planning at the level of local encampment clusters, grazing reserves controlled by committees of mobile herders, participatory monitoring and evaluation by genuine organs within the traditional system, and mediation among the stakeholders by sensitised pastoral representatives.

The role of government is to facilitate enforcement of the decisions. Similar workshops could provide platforms for joint reflection to support ongoing efforts in participatory development planning.

Conclusions

The proposed stepwise research process focussing on herd mobility generated specific knowledge on pastoralists' rangeland-management strategies and helped to understand the current constraints to applying them. It revealed the external and internal disturbances to which Borana's IK had been exposed but also that IK persisted in some applied rangeland management strategies and negotiation networks. The three research steps preceding the final workshops allowed an informed debate mediated by development agents. These multi-stakeholder consultations could be the starting point for implementing negotiation platforms as a framework for the participatory exploration of the potentials and constraints of IK-based development. Development agents should support pastoral communities in redefining their objectives and building on the persisting IK for the continuous development of pastoral IK and its application. A fundamental challenge is the implementation of a favourable pastoral policy to assure appropriate grazing and water rights. This depends on the willingness of decision-makers to learn from pastoral IK, to assure transparent information exchange and to agree upon concerted development actions.

Restructuring mobile rangeland management will not turn back the clock or overcome the fact that many Borana households depend on additional sources of income and can no longer survive on pastoralism alone. Population growth, recurrent droughts, lack of investment opportunities, and political and economic marginalisation hinder progress. However, our findings suggest that exploring pathways to support mobility and pastoral control of resource use makes development concepts more tangible and target-oriented. Supporting mobile pastoralists in political organisation and the constructive use of networks can help keep IK in action for the benefit of the rangelands and their users.

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Part 6

Aspects of Eco-Design and Development, Innovation as well as Renewable Energy Sources

Marion Hersh*

Ecodesign for All: Principles and Practice

Abstract: This paper develops further the concept of ecodesign for all introduced by the author. Ecodesign for all combines the techniques of design for all and sustainable design and should be considered part of good design practice. Design for all is a design paradigm which aims to take account of the needs of all users, regardless of disability, size, age, gender, ethnic origin or other factors, in the design of products, devices, services and environments, whereas sustainable design aims to reduce the negative environmental and social impacts of products and processes across the whole lifecycle. The paper discusses the importance and role of design and uses myths about assistive technology to illustrate myths about technology in general. The concepts of design for all, design for environment and design for sustainable development are considered. The importance of end-user involvement in the design process is discussed and some of the methodologies for involving end-users are presented. The concept of ecodesign for all is illustrated by the example of the design of a telephone handset. The paper concludes with a preliminary set of principles to be taken account of in ecodesign for all, with further work underway to extend and develop these principles.

Key words: design for all, sustainable design, end-user involvement, telephone example

1. Introduction: Environmental and Social Problems

Technology has always been important for human society. However over the past few decades the dependence of human society on different types of technology has increased to the extent that the resulting explosion in the use of technology has put considerable stress on the natural ecosystems of the planet. This has led to the possibility of human resource consumption and waste generation exceeding the capacity of natural source and sink systems, with the consequent likelihood of environmental disaster. On the other hand, although there are problems with the 'technological fix' approach of assuming that technology is able to solve all problems, it does have the potential to resolve many real social problems. In particular, technology has the potential to increase the opportunities available to disabled people by overcoming infrastructural barriers and thereby encourage their social inclusion and greater participation in society. Sustainable design of processes and devices can also be used to reduce the negative impacts of technology on the environment and society, but will also require changes in lifestyles and attitudes, particularly in the industrialised countries, to reduce resource consumption and waste generation.

* M.A. Hersh, Department of Electronics and Electrical Engineering, University of Glasgow, Glasgow G12 8LT, Scotland, Tel: +44 141 330 4906, Fax: +44 141 330 6004, e-mail: m.hersh@elec.gla.ac.uk

Since the focus of this paper is design rather than social and environmental problems, some of the main social and environmental problems will be listed below without discussion. It should be noted that this list is intended to be indicative rather than all-encompassing. There are a number of sources of more detailed information, including (Baker, 2005; Elliott, 2005; Gupta, 1998; Hersh, 2006a; Weaver et al., 2000). The issues include the following:

- Global climate change, with associated sea level rises and threats to food supplies due to anthropogenic (human generated) emissions of greenhouse gases, particularly carbon dioxide.
- Damage to the stratospheric ozone level by chlorofluorocarbons.
- Soil, water and air pollution due to industry and agriculture.
- The destruction of habitats and a reduction in biodiversity, which is both of value in itself and important for security of food supplies.
- Work related injuries and disease, which are responsible for the deaths of over one million people each year and at least 250 million accidents and 160 million new cases of work related diseases each year (Brundtland, 2002).
- The impact of pollution on human health. For instance the life expectancy of workers in the oil, chemical and nuclear industries in the USA is 10 years less than the USA average (Mazzocchi, 1990).
- Exhaustion of natural resources. It has been estimated that critical natural resources would last less than a decade if by 2030 average global consumption reached the level of average USA consumption in the late 1980s (Frosch and Gallopoulos, 1989).
- High levels of unemployment, with 150 million people unemployed and another 900 million underemployed at the end of 1998 (Renner, 2000).
- Poverty, with nearly half the world's population living on less than the UN minimum to meet basic needs of two dollars per day (World Bank, 2004).
- Inequality in access to resources both within and between countries. For instance the richest fifth of the world's population is responsible for 58% of total energy consumption, whereas the poorest fifth uses less than 4% of the world's energy (Michaelis, 2002).
- An increasing digital divide, with close to one computer for every three people in the European Monetary Union, whereas 150 people have to share each computer in South Asia (ITU, 2003ab).
- The discrimination and social exclusion experienced by disabled people and other minority and marginalised groups.

The responses by governments to very serious environmental problems can generally be characterised as too little too late. Agreements have been made in a number of important areas such as the reduction and then banning of CFCs and the reduction of emissions of carbon dioxide and other greenhouse gases. However the approach of most governments has tended to be a very narrowly defined national self-interest (Scherr et al., 1993). Most governments are also concerned that the burden of

any agreements or measures to be taken falls elsewhere. Therefore the 'developed' countries stress the importance of population control and ignore the disproportionately high resource consumption of their own smaller populations. There is now broad scientific consensus that anthropogenic emissions of greenhouse gases have led to climate change and a resulting sea level rise. However the USA has withdrawn from the 1997 Kyoto Protocol to the UN Framework Convention on Climate Change and few of the industrialised and former Eastern bloc countries are on target to meet their Kyoto commitments (Dunn and Flavin, 2002). In addition, the target of an average reduction of 5.2% of greenhouse gas emissions by 2008-12 relative to 1990 levels is itself insufficient.

The paper is set out as follows. Section 1.2 considers the importance of good design and section 2 uses some of the myths about assistive technology as a starting point to discuss myths about technology in general. The involvement of end-users in the design process is considered in section 3. Sections 4 and 5 discuss design for all and design for environment respectively. An illustration of ecodesign for all by the example of design of a telephone handset is given in section 6 and conclusions and recommendations for good ecodesign for all practice are given in section 7.

1.2 The Role of Good Design

Good design practice can have an important role in reducing the negative environmental and social impacts of technology and promoting social inclusion. However it should not be considered a universal panacea. Good design practice needs to take place in a political and social context which is committed to reducing consumption, as well as equality of opportunities, equal access to resources and social inclusion. For instance, design for easy upgrading and durability is only meaningful if users take advantage of it and, for example, upgrade their computers rather than buying a new one every few years.

Engineering design involves the development of a system, component or process to meet particular criteria. Decisions made at the design stage will largely determine product performance, including its environmental and social impacts, throughout the lifecycle and which social groups, including disabled people, are able to use the product. Up to 85% of costs are committed by the end of the preliminary design stages (Fabrycky, 1987). Design choices, such as the choice of materials for a given product, how they are processed and whether coatings and labels are applied to plastics, will also have significant effects later in the product life on, for instance, waste production in the manufacturing process and the viability of recycling at the end of life.

Thus, decisions made at the design stage generally have much less impact on costs than making the same decisions later in the process. Changes introduced after the design stage will generally give rise to additional costs, be more technically complicated and may not result in satisfactory performance. For instance, many of the underground stations in Glasgow, Scotland are not accessible to wheelchair users. If wheelchair accessibility had been considered at the original design stage, it could have easily been incorporated. However making the existing stations accessible to

wheelchair users is going to be technically more complicated and probably have high costs. In some cases the impact of the decisions already made may be such that it is no longer possible to meet certain performance specifications.

Both sustainable design and design for all are of vital importance in designing products and services which meet real, rather than artificially created needs and are accessible to as many people as possible, while having minimal environmental and social impacts. It is therefore fortunate that both sustainable design and design for all can also have economic benefits. For instance environmentally friendly design generally results in reduced material and energy consumption and a reduction in waste, leading to cost savings for materials, disposal and permit requirements. There may also be improvements in employee morale and the avoidance of environmental fines, as well as new business opportunities. Design for all can also lead to new business opportunities, as products and processes become available to a wider section of the population.

However the two design paradigms of design for all and sustainable design have remained totally separate from each other and the associated research communities totally distinct and apparently unaware of each other's work. The need to combine these two design concepts has given rise to ecodesign for all (Hersh, 2001a). This is both in accordance with holistic systems based philosophies (Hersh, 2006a) and should be considered a part of standard good design practice rather than an optional extra.

2. Myths about Technology

In this section a selection of myths taken from the Tools for Life web page (http://ldonline.com/ld_indepth/technology/tlf_mystery.html) are used to illustrate a number of common misconceptions about technology, its applications and limitations. The web page discusses the myths and realities of assistive technology, which is used to overcome the social, infrastructural and other barriers experienced by disabled people to full and equal participation in all aspects of society. Examples include assistive listening devices, mobility (obstacle avoidance) devices for blind people, and wheelchairs. The full range of assistive technology for people with sight and/or hearing impairments is discussed in (Hersh and Johnson, 2003, 2006). Some of these myths are listed below:

1) Assistive technology is a magic cure-all for disabled people.
2) All technology is "high tech" and expensive.
3) People want the latest and most expensive devices.
4) One source has all the answers.
5) If a technology solution is available, it will be used.
6) Determining your assistive technology needs is done only once.
7) Product descriptions are always accurate.

The first two myths are particularly telling and illustrative of the 'technological fix' approach, which assumes that technology will be able to solve all environmental (and other) problems. It is consequently considered unnecessary to reduce resource

consumption or make other life style changes. The first myth also shows the lack of acceptance of diversity and difference and the need for a change in social attitudes to disabled people and other minority groups. This will facilitate a focus on accessibility as the responsibility of society as a whole rather than disabled people being required to find individual solutions. The second myth illustrates the stress on complicated, expensive and prestigious solutions at the expense of simpler, cheaper 'low tech' ones. Clearly there is a role for different types of technologies which fulfil different functions and which can complement each other. However there is a tendency to assume that 'high tech' is better. In the context of technology projects in 'developing' countries this has often led to decisions which seem to be based more on the prestige value of the technology than its ability to solve real problems and meet real needs. This is possibly one of the factors in the preference for large dams which flood wide areas, leading to the destruction and evacuation of villages and the destruction of wildlife habitats. This preference for large dams has also been influenced by the accounting methods used (Hersh, 2006b), which distort the relative costs of different energy systems, for instance by discounting the value of long term future energy generation. However research shows that small scale dams are more efficient and generate more energy per unit area (Takeuchi, 1997). There are also issues of control, since small projects, such as a small dam can be managed locally and can be tailored to meet local needs, including in providing employment and meeting energy needs, whereas large scale projects such as large dams generally require centralised control or management by a large company and are unlikely to prioritise local needs.

Myths 3, 5 and 7 are related to each other. For some reason it seems to be assumed that an imperative to apply a technology follows automatically from the ability to do so, independently of the nature of its applications, how useful or relevant they are, ethical considerations or other factors. It seems to be further assumed that the technology might as well be used if it exists as someone is going to use it. However, although (Hersh, 2001b) existing technologies do effect subsequent choices and there are feedback mechanisms between technological and political change, an assumption of technological determinism (Street, 1992) is analogous to a renunciation of free will. In some cases, for instance with regards to military technology and even nuclear power, this myth has been quite dangerous and led to unsustainable and dangerous technical developments, as illustrated by the arms race. It should be recognised that it is possible to take a principled decision not to use certain types of technologies, for instance when their applications are purely destructive, as in the case of military technology or, in line with the precautionary principle (Agenda, 1992; Harremoës et al., 2002) when there is insufficient information about the consequences of their use. Myth 7 has a tacit assumption that where real needs do not exist they will be manufactured through clever advertising.

Myth 4 relates both to the cult of experts and, together with myth 6, to the idea that there is generally a unique or overall best (technological) solution. This is rarely the case and there are frequently several options with different advantages and disadvantages, though some solutions will have considerably lower environmental

and social costs than others. Sometimes the best solution will not involve 'technology' in the traditional sense, but different approaches. This could include changes in attitudes and lifestyles or a combination of technological and non-technological changes, such as a modal switch from private cars to minibuses or trams with minimal energy consumption and emissions. Technology, particularly modern information and communication technology, is in a state of constant development, with resulting increases in the available facilities and functionality and changes in its social and environmental impacts (sometimes in the direction of reduction). It is therefore useful to constantly re-examine and update technology solutions and choices.

3. Involvement of End-Users and End-User Issues

Consulting with end users should be any important part of the design process, particularly since most design is carried out by professionals, such as designers, engineers and architects, to be used by people who are not designers, engineers or architects. In addition, women and minority groups, including disabled people, are underrepresented amongst the design community. User participation in design has been identified as one of the critical requirements for technology acceptance (Rogers, 1995), since it is only end-users who can decide whether or not a device is appropriate for them and meets their needs. In addition, the effectiveness of features to reduce the environmental impacts of products, such as power management systems, may depend on appropriate actions by users. Despite the importance of user-centred design, user requirements are often determined after the system functionality has been defined (Stevens, 1997), resulting in products users do not identify with. Devices may also not be adapted by end-users for reasons not related to functionality. For instance, the most common mobility (obstacle avoidance) aids used by blind and visually impaired people are the long cane (white stick) and guide dog, despite the development of a number of electronic travel aids. However, most end-users will benefit from intuitive and easy to use products resulting from a user-centred requirements analysis framework (Smith-Jackson et al., 2003).

There has been some progress in the areas of participatory design and working with end users, including disabled end-users (Bühler, 2000; Henderson Chatfield et al., 1998; Placencia Porrero et al., 1995; Smith-Jackson et al., 2001). However there is still a need for further research in this area.

An example of approaches for working with end users is the FORTUNE concept of user participation, which is based on the following principles (Bühler, 2001):

1. Partnership as a basis.
2. Users as members and/or representatives of organisations.
3. Users should receive payment on the same basis as other participants.
4. Guaranteed accessibility of all relevant materials and premises.
5. All partners guarantee confidentiality, respect and expertise.
6. Detailed project plan, including time and resource planning for user participation.

7. Partnership is implemented from the start of the project.

Another participatory approach is the H-CAD (Human Centred Assistive Technology systems Development) methodology (Duffy et al., 2004; Stapleton et al., 2004) is a human centred approach which has been applied successfully to the design and implementation of assistive systems for adult learners with dyslexia. It uses careful management of user involvement and contextualisation of the work to reduce the problems of isolation sometimes experienced by people with specific learning difficulties in assistive technology projects.

The Needs Analysis and Requirements Acquisition framework (Smith-Jackson et al., 2003) was developed specifically to support requirements capture for disabled users of mobile phones, but could be used for other products. The approach can be used in an early phase of product development and modified and repeated throughout the development cycle. It is based on the following four procedures:

1. Eliciting information to identify appropriate topics for interviews and tasks to obtain relevant facts, opinions and statistics.
2. Carrying out the first iteration of user requirements and design guidelines using the results of the first stage.
3. Development of the requirements and implementation in the product or prototype.
4. Evaluation of the accurate implementation, usability and relevance of the guidelines by a new sample of users.

The results of implementation and evaluation are then fed back into the elicitation stage of the process. Engineers and other designers are more likely to involve end-users in the design process and do so effectively if engineering and design courses include training on working with end-users. This training should preferably be a part of the core material and include disability equality training. This is carried out by disabled people and aims to convey a social rather than individual or medical model of disability and identify and address discriminatory forms of practice towards disabled people. In the social model the disadvantages experienced by disabled people result from social and physical barriers rather than individual impairments. The social model approach to understanding disability can be extended to other forms of discrimination and difference. It also provides a further rationale for design for all (see Section 4) in terms of society's responsibility to avoid discrimination and disadvantage through designing products, processes and environments which are fully accessible to the whole population.

In addition to the direct involvement of end-users, there are approaches based on modelling and the use of data bases. However modelling approaches and data bases should be used to complement and supplement the direct involvement of end-users rather than as a substitute for end-user involvement. Modelling approaches include the use of personas, profiles and metaphors. Personas (Cooper et al., 1999) and profiles can both be used to create archetypes to represent users to try to make software products more user centred and bridge the gap between designers and end-users. Personas are based on user goals, whereas profiles are based on user needs and

the interaction between needs and constraints (Panagiotis et al., 2004). Multiple metaphor environments can be used to carry out context sensitive processing and select suitable symbols to interact with the user, based on information supplied by a tool called the user modelling component, (Stephanidis et al., 1999ab). Information can include a user profile, user preferences and information on tasks. However, there are security and privacy issues related to the storing and processing of this data, as well as the need to ensure that the options provided to the user are appropriate.

Databases on, for instance, anthropometry (body dimensions) and human capability tend to have limited information on older and disabled people and rarely include people whose body dimensions do not correspond to a particular 'norm', such as tall people with relatively short arms. There is therefore a need for data for a much wider range of people. This data should include anthropometric data and data on task based capabilities, such as the reach envelope (the region people with particular characteristics can reach with their arms), and behaviour including strategies for carrying out and completing specific tasks and activities (Marshall et al., 2002).

4. Design For All

Discussion of sustainable development has often focused purely on its environmental aspects. However the social and developmental aspects of sustainable development are equally important. A very significant, but neglected, issue is the inclusion in society of previously excluded groups, such as disabled people. Social exclusion results from a mixture of factors including inappropriate design which makes products, services and environments inaccessible, as well as discrimination and prejudice. About 10% of the world's population is disabled or over 60 years of age (Pieper et al., 1997). Demographic changes with an increasing proportion of older people (in the richer countries) is also leading to an increase in the proportion of people with age related impairments.

The disability movements are growing and there have also been changes in social policy, leading to increasing recognition of the importance of social inclusion for disabled people and changes in legislation. For instance the UK Disability Discrimination Act 1995 require workplaces, educational establishments and goods and services to be made accessible to disabled people and to provide 'reasonable adjustments' to avoid discrimination against disabled people. All these factors have combined to make the development of technology which takes into account the needs of disabled people and enhances the options open to them increasingly important.

The terms 'design for all' and 'universal design' can be used interchangeably, with design for all more common in Europe and universal design in the USA. These are much wider terms than 'accessible design' and 'barrier free design' which are again approximately synonymous. In particular, design for all is based on considering the various needs of a single diverse population, whereas accessible design is generally based on a 'normal' population and special consideration of people with additional accessibility requirements because they differ from the 'norm' (Iwarsson et al., 2003). Design for all should occur right from the start of the process, whereas accessible design is sometimes considered an addition to traditional design which can take place

at a later stage. Design for all should include both design for usability for all and design for accessibility for all. Usability is the extent to which a product is easy or intuitive to use by everyone. The main features of usability (Nielsen, 1994) are ease of learning, efficiency, easy to remember procedures and operation, low error rates and high satisfaction. Accessibility is the extent to which a system can be used by the widest possible section of the population without modification. It differs from usability which is about ease of use and performance of the product or system in the specified manner.

Design for all aims at a holistic approach to producing devices, products, environments and services which can be used by and are attractive to as wide a range of the diverse population as possible. It is based on consideration of the needs of all the diverse groups of which society is composed, including disabled people, rather than being based on an assumed norm or average (male) person. Design for all should allow the whole population, regardless of disability, size, age, ethnic origin or other factors, to access, understand and use the full functions of a wide range of different environments and products (Bougie, 2001).

However, traditional design approaches have often been based on a norm with regards to physical attributes and other factors which does not take account of the physiological and other differences between different population or ethnic groups (Pierce, 1963; Sen, 1982). In addition most design is carried out by men and therefore may be inappropriate for women both in terms of physiological differences and functionality. For instance male designers have designed smart houses based on advanced technology (Berg, 1994), which will switch on lights when someone enters the house or the music when the oven (or more likely the microwave) switches off, whereas female designers are more interested in practicalities, such as cupboards which clean the dishes or clothes. However some smart functions do have wider applications, for instance in turning the lights on and off in public buildings to save energy as people move round them and in providing alternative control strategies for disabled people with limited hand or arm movements to enable them to open and close windows and doors and operate appliances.

Thus design for all has the advantages of reducing the need for individual customisation and bespoke designs (Marshall et al., 2002) and enabling the diverse population, including disabled people, to obtain goods at a cheaper price from standard outlets, rather than having to pay more from specialist outlets, which are less widely available. In addition to extending the diversity of people who can use a particular device or access a particular environment without requiring further modifications, design for all will sometimes have benefits for ‘standard’ users in making products easier to use or extending the options available to all users.

The Centre for Universal Design has formulated the following seven principles of universal design (Follette Story, 2001):

1. Inclusive:	Usable by diverse population groups; products should have common designs and avoid designs that stigmatise particular groups.
2. Flexibility in us:	Accommodates a wide range of individual preferences and alternative methods of operation, with easy customisation.
3. Simple and intuitive to use:	Easy to understand, regardless of experience, knowledge, language skills or current concentration level.
4. Perceptible information:	Communicates nessessary information effectively, regardless of ambient conditions. Information is represented redundantly, so that it can be accessed in a number of ways or through different senses.
5. Tolerance for error:	Minimises hazards and the adverse consequences of accidental or unintended actions. There are checks and balances to prevent user mistakes and to support easy recovery if mistakes are made.
6. Low physical effort:	Can be used efficiently and comfortably, with minimal fatigue. Does not physically tax the user.
7. Size and space for approach and use:	Appropriate size and space for approach, reach, manipulation, and use, regardless of body size, posture, or mobility. Products should be small enough to carry or should conform to operation in the user's environment.

In practice there are frequently tradeoffs between different design specifications, so that it may not be possible to make some products and environments directly accessible and easily usable by the whole population without an increase in cost or complexity which would be in itself a barrier to use. There are often conflicts between different design requirements, such as portability, light weight and small size for devices such as mobile phones and personal data assistants and the need for reasonable size screens and keyboards to make reading and data entry easier. There can also be conflicts between the needs of different groups of users. For instance, the sounds provided to inform blind people when it is safe to cross the road or the door of a train is open can be very distressing to people who are sensitive to noise. In the case of products and devices for individual use a degree of customisation with the ability to switch auditory and visual feedback on and off can resolve this type of problem. However, in communal or public contexts it may be more difficult to find an appropriate solution.

The design for all principle can be extended to include compatibility with assistive devices and good interface design (Stephanides et al., 1995). In this extended definition design for all principles include products, devices and environments designed in the following three categories (CEN, 2002):

- To be used by most users without modification

- To be compatible with appropriate assistive devices
- to be accessible through good interface design which allows users to control or input data to the device through a range of different types of input devices and obtain the desired output information through a range of different types of output devices.

Extending design for all principles in this way gives additional flexibility and may avoid the complexity that would result if all devices and environments were required to be directly accessible. There will generally be some additional costs, though these are likely to be less than if extended design for all principles had not been applied.

5. Design for Environment

A number of terms are in use, such as design for environment, sustainable design, green design, ecodesign and environmentally responsible manufacturing. The term design for sustainable development covers the systematic consideration of design issues relating to environmental and social impacts over the full product or process life cycle. However, most of the focus has been on design for environment and there has been relatively little work on the social impacts of technology and manufacturing. Design for environment has the following three main goals (Rivera-Becerra et al., 1999):

- Minimising the use of non-renewable resources
- Effective management of renewable resources
- Minimising toxic releases to the environment.

A survey of the available techniques is given by Simon et al. (1998). Design for environment requires products to be designed to take account of the following (Szczerbicki et al., 2004; Thompson, 1999; Kuo et al., 2001):

- **Ease of disassembly** so that parts can be easily reused, remanufactured, refurbished or recycled. Strategies include minimising the number of components, different materials and assembly operations and using water-soluble adhesives rather than chemical bonds. Secondary coatings, finishes and plating and composite materials which are difficult to recycle should be avoided and snap fittings used wherever possible. A material identification scheme should be marked into parts to facilitate identification of different materials and the separation points between parts should be marked.
- **Ease of reuseability** to prolong the useful life of components. This reduces the amount of raw materials and waste and can save money. Modularity, quick-release snap fittings and durable components are recommended.
- **Ease of recyclability** is becoming increasingly important, particularly in the richer (and more wasteful) countries due to the increasing volume of discarded products. Strategies include using materials that can be recycled and for which collection and recycling technologies are available. Materials which are compatible with regards to recycling should be used and the

number of different types of materials reduced. A material identifier should be marked into parts wherever possible. Metals are generally easier to recycle than non-metals and using recycled materials supports the recycling process. Design should be modular and easy to disassemble and minimise the energy use and material downgrading that can result from recycling.

- **Ease of remanufacturing** or the restoration of used products or components to 'new' condition, thereby extending product life and promoting the reuse of components and materials.
- **Durability,** as the delay in product replacement reduces the consumption of raw materials and pressure on landfill. Strategies include promotion of long life and multiple use products and user friendly documentation for repair and maintenance. Appropriate measures should be used to reduce the relative costs of a new product and repairing an existing product, including high taxes on products that cannot be repaired. Design for disassembly principles facilitate remanufacture and recycling of parts and therefore extend product lifetimes.
- **Maintainability** to lengthen the useful life of a product through repair. This can also have cost savings, as retrofits to solve problems are generally expensive and equipment failure can disrupt operations and damage systems and/or buildings. Strategies include identifying modules that are subject to wear or more frequent replacement and designing them to be easily accessed, removed and replaced. As far as possible, components likely to need (frequent) replacement should be concentrated in a small number of modules. The number of tools required for disassembly and reassembly should be minimised and built-in self test indicators used to isolate faults and problems. All components should be durable, standard and easily replaced. There should be adequate clearance round connectors for viewing and access, cable routing which facilitates tracing and removal, and coding or labelling of wires and cables throughout their length for easy identification.
- **Energy consumption** is a major source of greenhouse gas emissions as well having financial implications. Energy consumption can be reduced by appropriate design, including energy management strategies and the use of energy efficiency labelling and information to support the purchase of energy efficient devices. The use of sustainable fuel sources should be promoted, though this may not be under the control of the designer.
- **Optimal use of materials** by minimising material use and, as far as possible, using only materials that are recycled, recyclable and energy efficient in manufacture and use, as well as readily available locally. Minerals should not deplete declining natural resources and should cause minimal pollution in extraction, processing, deployment, recycling and disposal.
- **Product takeback** The European Union Waste Electrical and Electrical Equipment Directive (WEEE, 2003), which is expected to come into force in 2007, requires producers to take back ‘waste’ electronic and electrical goods,

to reuse or recycle either the whole item or as many as possible of its components and safely dispose of the rest. Electronic and electrical goods are required to be designed to facilitate reuse, recycling and dismantling. There will be a register of producers of electrical and electronics equipment and recycling targets for different categories of waste. Retailers will be required to offer item takeback free of charge to consumers other than businesses. Due to the globalisation of markets in electrical and electronics goods the impact of this directive is likely to extend beyond the European Union.

- **Elimination or reduction of hazardous substances**: The Directive on the Restriction of Use of Certain Hazardous Substances (ROHS) in Electronic and Electrical Equipment (ROHS, 2003) requires equipment put on the market from 1 July 2006 onwards not to contain lead, mercury, hexavalent chromium, cadmium, polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs). Products which are found to contain these prohibited substances will be removed from European Union markets. Exemptions will include medical equipment and spare parts for electrical and electronic equipment marketed before the deadline. Although the Directive requires the total exclusion of the prohibited hazardous substances, in practice this will be interpreted in terms of maximum permitted concentrations.

Subsequent to the initial version of this paper, the Royal Academy of Engineering in the UK published the following principles for engineering (rather than design) for sustainable development (Dodds et al, 2005):

1. Looking beyond the immediate locality and the immediate future: This involves identification of the potential positive and negative impacts of proposed projects and actions in both the short and long term and both the local and global environments.
2. Being innovative and creative: There is generally not a unique correct solution and therefore creative and innovative approaches are required to identify several sustainable development solutions to allow flexibility as conditions change.
3. Seeking a balanced solution: This should focus on the future as well as the present, consider social, environmental and economic factors and aim to obtain gains in all three areas.
4. Engaging with all stakeholders: All the different stakeholders should be encouraged to apply their different views, perceptions and knowledge to the problems of sustainable development. Engineers (and designers) should try to participate actively in decision making as citizens as well as engineers (and designers).
5. Obtaining information about needs and wants: This includes the ability to distinguish between needs and wants and between real and perceived or societally created needs, such as for better cars rather than more accessible

facilities and better public transportation systems. It will also require engaging with stakeholders to identify attractive and sustainable futures. It is also important that the identification of needs and wants includes those of minority or marginalised groups, such as disabled people and older women.

6. Planning and managing effectively: This includes expressing aims in an open-ended way so as not to edit out innovative solutions, encouraging creative 'out-of-the-box' thinking and maintaining or preferably improving on existing sustainability practices.
7. Giving sustainability the benefit of any doubt: This is the precautionary principle of caution and includes considering the long term effects of decisions, acting cautiously when there is a lack of information or full scientific understanding and planning for the future.
8. Polluters who cannot avoid polluting, need to pay as well: It is clearly preferable to avoid pollution. However, while moving to zero pollution strategies, polluters need to be made responsible for the costs they impose on society, which will need to be identified. Mechanisms, for instance in terms of legislation and taxation, will then be required to ensure that polluters repay society for the costs they have imposed on it.
9. Using holistic whole life cycle approaches: This requires systematic evaluation of the life cycle impacts of products, processes and infrastructures and using a range of whole life cycle analysis and environmental and social impact assessment tools to support decision making.
10. Deciding on the right thing to do and then doing it well: Applying these principles, the design for environment principles discussed above, the universal design principles presented in Section 4 and the recommendations for ecodesign in Section 7.1 should lead to decisions which promote sustainable development. However, the way decisions are implemented can itself have environmental and social impacts. Therefore, the environmental and social impacts and other issues associated with onstruction, manufacture, production and transport should be considered as part of the holistic whole life cycle analysis.
11. Avoiding cost reductions masquerading as value engineering: This involves avoiding cutting down on sustainability in order to reduce costs and including any adverse effects on sustainability in value engineering, as well as being prepared to challenge assumptions. It also involves checking that design changes and/or user practices are not going to have negative impacts on sustainability.
12. Practising what you preach: Preaching about sustainable development by engineers and designers whose own practice is unsustainable is unlikely to have much impact.

6. Example: Telephone Handset

Telephones are very widely used, particularly in the industrialised countries. It is therefore important that they are designed to minimise negative social and environmental impacts and to be useable by the widest possible section of the population. In order to be specific this example will focus on the telephone handsets used with landlines. However it should be noted that mobile phone use is growing very rapidly and that there are both common and distinct factors which affect the design of mobile phone and landline handsets.

Design for all should include the following features

- Large keypad buttons to make dialling easier for people with reduced dexterity, for instance due to arthritis, and reduce the likelihood of pressing a wrong key for all users.
- A small 'pip' or bump in the centre of the keypad digit '5' to make it easier for a blind person to locate keys and dial the correct number.
- High contrast lettering on the keypad.
- An inductive coupler coil (telecoil) in the handset to make the telephone easier to use by hearing aid wearers. The telephone design may also require modification to compensate for the reduced sensitivity of the inductive coupler receiver compared to similar receivers without the additional coil.
- Receiver amplification, which is useful for hearing impaired users and to compensate for far-end users who speak very quietly or very loudly. Amplification can also be provided on the microphone path to assist users with speech impairments. Care is required in the design to give acoustic shock protection to prevent any danger of damage to the user's hearing when maximum amplification is used.
- Design which permits an additional receiver to be connected so that one user can listen to the call while another is speaking. For example a sign language interpreter or assistant may want to hear a call so they can relay its contents to a hearing impaired person who is using the handset to speak the replies.
- The ability to customise the sound of the ringer, which can allow users to make it loud enough to be heard at a distance, but not too loud when they are in the same room, and which can allow them to change the pitch to one they can hear more easily. Many telephones have two ringer settings, but few have different pitch options or total customisability.
- A visual ringer indication, for instance by a LED or flashing light, with the option to turn off the visual indication.

The above options do not add significant additional costs and many of them are included in existing telephones. Design for all options with higher associated costs include a combined textphone and telephone to allow deaf and hearing impaired users to communicate via text rather than speech or a combined videophone and telephone

to allow Deaf users to communicate in sign language and hearing impaired users to lip read.

A telephone handset consists of two main parts, the telephone body and receiver, which are connected by a cable. Both parts contain electronic components in a plastic case. Currently available telephone handsets have a number of features which facilitate recycling. In particular they are designed so that the receiver can easily be separated from the body of the telephone, facilitating reuse, and both the body of the telephone and the receiver generally consist of only one type of plastic. In addition most telephones have relatively low power consumption, though improved design could possibly reduce it further.

Unlike the case of mobile phones, where new features and smaller designs are continually becoming available, introduction of new features to landline telephones is relatively slow. Therefore a high proportion of users will probably be happy to use the same handset for an extended period as long as it continues to function satisfactorily. Therefore, the environmental impacts resulting from telephone handset disposal could be reduced by improving durability through identifying frequently occurring faults and modifying the design to reduce their occurrence or, if possible, eliminate them. However, the relative costs of purchasing a new handset and having the old one repaired and the relative difficulty in having an existing handset repaired compared to purchasing a new one (at least in the industrialised countries) mean that non-functioning handsets are likely to be replaced rather than repaired. One solution to this problem might be a modular design approach combined with design for easy assembly and disassembly. This would, for instance, allow either a faulty receiver to be replaced or total replacement of all the internal components in the handset case, thereby reducing material consumption. If this type of service was readily available at a significantly lower price than product replacement there might be a reasonable degree of take-up. If in addition, it could be combined with cleaning of the case, for instance by high pressure steam, to make the telephone look new, this service could become quite attractive, particularly if the environmental benefits were stressed.

Other features which would improve the environmental performance of telephone handsets by facilitating end-of-life recycling include the following:

- The use of snap fastenings rather than screws to hold the telephone together.
- The avoidance of sticky labels or the use of water-based adhesives for labels. This would require information to be engraved or provided in raised letters, which would have the further advantage of being accessible to blind people.
- Minimisation of packaging and the use of recycled materials in packaging.
- Material labelling system.
- Labelling of all wires and cables.

Good design practice should combine the features of design for all, design for environment and design for sustainable development.

7. Conclusions

The paper has developed further the concept of ecodesign for all introduced by the author (Hersh, 2001a). The principle brings together design for all and sustainable design and should be considered part of good design practice. The discussion of the two components of ecodesign for all has been used to develop a preliminary framework for ecodesign for all, which is presented in section 7.1. The importance of involving end-users in the design process has been stressed and some approaches for doing this have been presented. The concept of ecodesign for all has been illustrated by the example of the design of a telephone handset.

7.1 Recommendations

1. Study good practice and learn from previous mistakes.
2. Involve end-users in all stages of the design process.
3. Include training on working with end users and disability equality training in all design, engineering and architecture courses.
4. Use a modular design structure.
5. Design to minimise resource and energy consumption, waste and number of components.
6. Design to minimise negative environmental and social impacts and maximise positive developmental impacts locally and globally over the whole life span.
7. Include good design practice and design-for-all in all design, engineering and architecture courses.
8. Be aware of relevant legislation and go beyond minimal compliance.
9. Design in accordance with design for all, design for environment and design for sustainable development guidelines.

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Jožica Knez-Riedl*

Developing a Sustainable/Holistic Firm

Abstract: The role of organisations is growing in the endeavours for sustainability. Our paper discusses the characteristics of a sustainable firm, which demands a holistic perspective. Trends in the system theory (especially living system and viable system perspectives), theory of a firm (system theory of a firm and knowledge-based theory of a firm) and economics (environmental economics, ethical economics) can help promoting sustainable/holistic firm and, at the same time, removing several barriers to it. Without both the requisite view of the system as a whole and the ethics of interdependence (claimed by the Dialectical System Theory) the contemporary firm cannot achieve the attributes of sustainability.

***Key words*:** dialectical system theory, environmental economics, ethical economics, ethics of interdependence, holistic/systemic analysis, business viability, knowledge-based theory of a firm, living system, sustainable firm, system, viable system.

1. Introduction

Humans are a forgetful and biased part of nature, especially while thinking and acting as competing firms. Mankind's sustainability, therefore comes to be questionable. Increasingly severe environmental conditions are the result. The struggle for better quality of nature (including humans and society) and for sustainability of society (including several types of organisations) emphasises the need for a more holistic/systemic understanding and management of dispersed and scarce resources and waste. The question of how to manage this problem, which is of economic and ecological/environmental nature, is occupying scientists and practitioners of different disciplines. But they rarely work together on an interdisciplinary/cross-disciplinary basis. A lack of the requisite holistic perspective results, even in the most innovative countries (USA, Japan, EU) and their firms. The vicious cycle cannot be broken. (Kyoto agreement discussions demonstrate this clearly).

Our discussion is hence focused on characteristics of a sustainable firm, which differs from a firm successful in conventional economic terms (e.g. forgetting about the cost of nature and long term costs). As a theoretical background, different theories of a firm complement each other in explaining the same phenomenon. For inter/cross-disciplinarity we integrate system theory of a firm, knowledge-based theory of a firm, environmental economics, and ethical economics. With support of these theories we:

- Discuss the firm as a system (in general, as a living system and viable system),
- Explore characteristics of sustainable firm,

* Prof. Dr. Jožica KNEZ-RIEDL, E-mail: *jozica.knez@uni-mb.si*, Prof. Dr. Matjaž MULEJ (Emeritus), E-mail: *mulej@uni-mb.si*, both University of Maribor, Faculty of Economics and Business, 2000 Maribor, P.O.B. 142, Slovenia

- Suggest some approaches to overcome the barriers to a sustainable firm, especially to bridge the gap between knowledge and action, mono-, multi-, trans-, inter- and cross-disciplinarity.

One possible way is the holistic/systemic analysis of business viability. In practice its importance, as a determinant of the business performance, is growing, because several stakeholders (including a firm itself) are interested in disclosure of critical data, including environmental performance and business moral. Therefore the analysis should enable communications ("stakeholders dialogue") based on the "maxim of truth" (Hopfenbeck, 1992).

2. Understanding a Contemporary Firm Theoretical Background

2.1 A firm as a System

A system in general can be viewed as anything that takes its integrity and form from the ongoing interaction of its parts (Senge et al., 1999). It can be explained as a complex of elements or components directly or indirectly related in a network of interrelationships of various kinds, making it constitute a dynamic whole (Buckley, 1998). But the formal definition of a system tells nothing about its content. A firm can be economic system, business system, social system, or technical system, etc. Therefore Mulej (2000) emphasises that in determining a firm as a system the viewpoint should be stressed. To him system, but nearly only to him (Dubrovsky, 2001) is a mental picture of any real/existing object introduced from a selected viewpoint (Mulej et al., 2000, and earlier, since 1974).

For a firm as a **social system** the aspect of human interaction is crucial. But the interactions with natural environment must be considered, too. The "total organic interdependency of all possible elements and their interactions" (Kopzinsky, 1996) is therefore important.

The *living system perspective* assumes that human groups, processes, and activities are self-organising (Mulej et al., 2000). Miller's (1978) view of organisation as one of hierarchical levels of living system considers a goal-seeking subsystem, the so-called "multi-level goal system", and growing complexity.

In the eighties the concept of living systems was first used in the management context, especially in the field of management accounting (Swanson, Miller; 1988, Swanson, Miller, 1989)!

Aspects taken into account and discussed regarding an organisation as a living system bring us closer to the concept of a *sustainable firm.* For interaction with its environment the living system should be capable of *adaptation, learning, and development,* which are of vital importance for such as system (Bell et al., 1997). These capabilities are imperatives for a sustainable firm to survive and prosper in (requisite) harmony with its environment.

Viability, defined by Beer (the author of the Viable System Theory – VST) presents the capability of an entity such as an individual or an organisation to survive in a rather demanding environment (Espejo, in Mulej et al., 2000). Because of the growing requisite variety, the creative potentials of a firm are crucial, especially in

order for it to respond to unexpected, unknown facts and events. A considerable characteristic of viable systems is their capability to keep their own (independent) development by self-solving their problems themselves. Capability of a system to adapt is important even in very short term. The ability of a firm to maintain its integrity and identity becomes one of vital importance in the long term.

2.2 System Theory of a Firm

Despite of several viewpoints and directions in the development of the theory of a firm (as critique of the traditional theory of a firm) very little attention was paid to the system theory of a firm. That could be explained by dominating fragmentation into elements of a system, leaving aside their interrelationships which are the key feature of the system approach (Kopzynsky, 1996). By the open system view, understanding of how firms really function could be improved. It is important for professionals to have an ethical decision made upon resources (about their creation, employment, and utilisation). By system theory of a firm the input, throughput and output characteristics can be viewed in their interdependence contributing to sound results and harmonised performance. That is not possible without considering (possible) environmental effects on the firm and, vice versa, effects of a firm on the environment and on the level of the requisite holism, i.e. neither with the aim of total holism (by a system of all viewpoints) nor within a single viewpoint (causing a fictious holism), but somewhere between them (Mulej, Kajzer, 1998; Rebernik, Mulej, 2000).

2.3 Knowledge-based Theory of a Firm

The question of knowledge has become crucial because of abundant data and information, on the one hand, and of numerous unsolved problems, on the other. To knowledge as a production factor and as a scarce resource great attention is paid in today's "knowledge economy". Knowledge-based theory of a firm was studied by prominent economists like Hayek, Penrose, Cyert March, and Drucker (see Knez-Riedl, Kajzer, 2000). In recent years economists like Grant, and Spender have investigated knowledge generation, application and transfer (Ib.). All these authors contribute(d) to the development of knowledge-based theory of a firm, which is exploring the phenomenon of knowledge not only because of its scarcity and dispersion, but equally because of its potential of increasing returns. Especially, the ethical use of knowledge is becoming critical (again).

2.4 Environmental Economics

Increased problems of natural resource exploitation, the value and consideration of externalities and waste, the cost of economic growth and of protecting the environment (environmental costs) are predominant reasons for the development of environmental economics. It is based upon new views on resources, decision-making, efficiency, and effectiveness. The question of environmental costs definition and typology is still being discussed. Being a relatively new category, with some hidden characteristics, different definitions of environmental costs are given (Kolk, 2000).

They can be viewed as caused by business impact on the environment and the society, which are not accountable. They could be caused by environmental measures and considered to be a financial burden for a firm. One of the main goals of environmental economics is to help people/firms internalise the environmental costs (Kolk, 2000, Hawken, 1994), caused by firm, and to apply the principles of sustainable development on the business level. Thus environmental economics confronts economic principles with environmental ones and searches for several alternatives for successful business activity being environment friendly and efficient at the same time (economic and environment efficient, "eco-efficient").

2.5 Ethical Economics

The economics is concerned with the purposeful action of humans, and with the study of choice (Edel, 1973). It raises the question about morality and rationality, about moral principles of co-operation, discussion about altruism, and selfishness (Lunati, 1997). The author compares the neo-classical firm with the ethical firm. In pursuing its goals, which is maximum profit, the neo-classical firm is fiercely competitive, using aggressive and even immoral means, at the expense of consumers and other firms. The profit motive is relevant for the ethical firm as well but along with the "certain standards of profitability". In this way the ethical firm enhances its responsibility towards business partners and other stakeholders. It is at the same time searching for profit and therefore competitive, but also co-operative. It respects such values as altruism, co-operation, trust, truth ("the maxim of truth"), commitment and fairness. Collins and Porras (1997) found that such values are typical of visionary firms and help them make a lot of money in the long run. (See also: Palcic, Mulej, 1994)

Besides business ethics in general, the ethical question in the field of economics is particularly raised in the context of investments. Ethical investors and moral funds reflect a broader responsibility, not only in a narrow economic (=profit) sense or as a result of legal rules. For Griffits and Lucas (1996) a moral businessman is a "rational moral being", not just "an economic manipulator".

In ethical economics, beside values and responsibilities, the interests, especially, conflicting ones, moral considerations and arguments of decision-making are taken into account.

3. The Characteristics of a Sustainable Firm

According to the Total Quality Movement the so-called excellent quality companies strive for zero-defects. Similarly, the "green quality" companies strive for zero emissions (Dechant and Altman, 1994). This is only one aspect of the sustainable firm. Among other characteristics, there is the fact that a firm exists and functions as a part of nature. The firm is surrounded by nature, which should be treated as a stakeholder, as well. On the other hand, the firm should operate in accordance with natural cycles and processes (Ryland, 2000).

The greatest change and challenge is the understanding of success. A sustainable firm is successful in an economic sense (being profitable), and, at the same time, in

an environmental sense. Therefore we can agree with the statement that "eco-efficiency" is an extension of resource efficiency (UN, 1999). The advantages of the "eco-efficient" companies reflect in environmental friendly operations and results, which do not hamper cost effectiveness and financial results (value) of a firm. Such firms

- Use less resources thus reduce emissions (and externalities);
- Improve cost structure and lower costs;
- Increase value of products and services,
- Decrease the environmental risk,
- Creating greater financial value.

4. The Barriers against Sustainability of Firm, and Some Related Solutions

There are several barriers (within and outside firm) hampering the development of characteristics, needed for a sustainable firm. Especially severe are the following ones (which are mainly interwoven):

1. Low environmental consciousness and ignorance of environmental problems:

- Nature is not treated as a stakeholder, but merely exploited and polluted.
- Predominant philosophy of producing as much as possible, not as much only as is useful for covering needs.
- Ignoring and breaking of natural life cycles (not allowing the regeneration of renewable resources).
- Use of hazardous materials and technologies.
- Careless production and accumulation of wastes, "throw away consumerism" (Shrivastava, 1995).
- Opportunistic behaviour aimed at short-term profit.
- Too narrow an understanding of the firm (not as a social, living, and viable system) and its responsibility.

2. Hidden nature of environmental costs and a lacking transparency of environmental accounting.
3. The gap between:

- Concern and action (Knez-Riedl, 1997, Ryland, 2000) ,
- Knowledge and action (Ryland, 2000) and
- Socially constructed and natural rules.

4. The lack of:

- Systemic/ holistic thought and action,
- Ethical decisions and acting,
- Environmental and social disclosure of a firm,
- Stakeholders dialogue.

Among several possible ways the following can help to remove some of the barriers to the sustainable firm:

1. Increasing the environmental consciousness and improving the attitude towards nature by:
- Developing and using environmentally benign products (more durable, repairable), services and technologies,
- Careful use of natural resources and energy.
2. Defining environmental costs, developing environmental accounting and information systems, environmental metrics, and the disclosing environmental performance of a firm.
3. Enabling several kinds of learning, acquision and use of knowledge about the business impact on the natural environment, and vice versa.

In what way does the viable system theory reflect, on the business level? Attempts are evident in refinement of financial analysis, greater interest in environmental innovations and environmental management, even in Small and Medium size Enterprise (SME). The *analysis of business viability* is becoming an important determinant of the valuation of the financial statement. For that purpose the analysis is focused on business strategy, processes, and key indicators to monitor performance and risk (Bell et al., 1997). SQA (Sustainable Quality Alliance) provides recognition for organisations practising *excellence* and *innovation* in

1) Environmental stewardship (natural and man-made environments),
2) Social responsibility (human and community relations) and
3) *Economic viability* (continuous improvement and sustainable development)

(http//:www.ecoquality.com/squa/awardhome.html).

Both examples reflect a trend that firms disclose to the community the information regarding ecological dimension of their business activity. Several stakeholders are becoming very interested in such information (about firm's environmental goals, its strategy, risks, and performance) in order to be aware of (potential) risks or to avoid environmental damage, which can impact their sustainability and financial results, as well. The intention, and to some extent, even the obligation of environmental disclosure tackles several obstacles inside and outside a firm (e.g. opportunism, moral hazard, complex nature of environmental costs and obligations).

The holistic/systemic analysis of business viability is focused on relevant elements of business performance (the economic and environmental one). The findings enable the choice of business strategies, harmonised performance, which could and should be based on co-operation and dialogue with stakeholders. In this way the firm's vulnerability can be minimised. Its socially responsible behaviour, environmental consciousness, allocation of knowledge needed, ethical decision making and hence the environmental quality can be improved, as well. Thus, the economic results enable business success, as well.

5. Some Conclusions

The need for (dialectical) system thinking in resolving environmental issues is evident. To study them in isolation, not to explore them in the context of the larger entity and by using a dialectical system of viewpoints, results only in partial knowledge and action, which can cause counter-productive outcomes. Investigating an entity, means to explore its structure (the relationships between its components), its purpose and functioning. We can better comprehend the system's characteristics and functioning, if we study it as a part of larger system, and in the hierarchy of systems (Schiemenz, in Mulej et al. 2000).

Different aspects of a business (the economic, ecological, and societal aspects) ought to be harmonised and considered interdependently (Mulej, Zenko, 2000). General system theory, which deals with living and non living systems, helps to understand a firm as a system (Mulej et alt., 1996, 61). From the living system perspective some additional characteristics of a firm and, vital capabilities such as adaptation, learning, and development are visible. Viable system theory deals exclusively with organisational systems, that are vital and capable of caring for their own survival and development, that need co-operation and communication (Mulej, Zenko, 2000). The law of requisite holism, as a part of the Dialectical Systems Theory, helps us avoid exaggeration in either holism or one-sidedness, and requires every decision-maker to take responsibility for his/her level of holism. (See e.g.: Ecimovic et al., 2002; Potocan, Mulej, 2003)

The sustainable firm differs from a firm, successful in conventional economic terms, especially in the consideration of success, long-term direction, realisation of the principles of sustainable development on business and broader levels, and consideration of costs and of responsibility. It is always searching for alternative solutions (meaningful substitution, innovative combination of resources) and possibilities of decreasing the environmental information asymmetry. By using systemic/holistic analysis of business viability (not only in the financial context) one can develop viable business strategies. By formal and non-formal learning, by using and sharing of knowledge one can cope with many environmental issues. Besides moral and environmental investments the ethical credo of a firm is visible from other decisions made, which help building and maintaining social capital (business connections in forms of eco-partnerships and alliances). Ethics of interdependence (among specialists of different professions, among humans in general, among humans and other parts of nature) can support all these endeavours a big way.

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Majda Bastic*

Analysis of Slovenian New Products from Environmental Viewpoint

Abstract: The comprehensive goal of sustainable development calls for fundamental changes in how society makes market decisions – both in production and consumption. The challenge is to achieve economic prosperity but alter market activity so that natural resources and the environment are protected.

In an empirical survey of new products carried out in the year 2000, we were interested in what makes a new Slovenian product successful. We asked managers of Slovenian companies to select two typical new products introduced by their companies in the last five years, one a clear success and the other a clear failure. The results obtained by this survey were applied to analyze the importance of the environmental dimension in achieving competitive advantage of Slovenian new products launched on the market in the last five years. The environmental responsibility of products was analyzed together with 13 other items which can create competitive advantage of a new product. The analysis of relationships between the product's environmental responsibility and four indicators that measure the success of new products shows that environmental products are profitable. Finally, all these results are used to reveal the environmental strategies which have often been applied in Slovenian companies when developing new products.

Key words: Environmental strategies, Analysis of new Slovenian products.

1. Introduction

Traditionally, nations were competitive if their companies had access to the lowest cost inputs – capital, labour, energy, and raw materials. Because technology changed slowly, a comparative advantage in inputs was sufficient to achieve success.

Today globalisation is making the notion of comparative advantage obsolete. Companies can source low-costs inputs anywhere, and new, rapidly emerging technologies can offset disadvantages in the cost of inputs. It is no longer enough simply to have resources. Using resources productively is what makes for competitiveness today. Companies can improve resource productivity by producing existing products more efficiently or by making products that are more valuable to customers – products customers are willing to pay more for. Increasingly, the nations and companies that are most competitive are not those with access to the lowest-cost inputs but those that employ the most advanced technology and methods in using their inputs. Because technology is constantly changing, the new paradigm of global competitiveness requires the ability to innovate rapidly.

* Prof. Dr. Majda Bastic**,** University of Maribor, Faculty of Economics and Business, 2000 Maribor, P.O.B. 142, Slovenia, E-Mail:majda.bastic@uni-mb.si

This new paradigm has profound implications for the debate about environmental policy. It has brought environmental improvement and competitiveness together. Environmental progress demands that companies innovate to raise resource productivity. Developing countries that stick with resource-wasting methods and forgo environmental standards because they are »too expensive« will remain uncompetitive, relegating themselves to poverty (Porter and van der Linde, 1995).

2. Environmental policies

Before entering into details about environmental policies, firms' strategies should be examined to understand the nature of the mutual relationship. Briefly, three generic strategies can be distinguished which firms may pursue within a particular industry: overall cost leadership, a differentiation strategy or a focus strategy. Both cost leadership and differentiation are industry-wide strategies with a broad target, whereas a focus strategy aims at a particular buyer group, or a specific product segment or geographic market. Although a cost leadership strategy also implies sufficient consideration of aspects such as quality and service, firms economise as much as possible to keep costs, and thus prices, low. This can be achieved, for example, by limiting product offerings and customer service, and by reducing the complexity of products. In a differentiation strategy, costs are considered as well, but firms strive to outperform competitors by offering products with unique characteristics.

These generic strategies are highly relevant to environmental management. In the case of cost leadership, environmental measures will primarily be judged on cost criteria, and short-term considerations are likely to prevail in this area. A strategy of differentiation may imply that the specific features include environmental aspects to which customers attach additional value. Finally, products with specific environmental qualities or even environmental products might well fit into a focus strategy (Kolk, 2000).

The respective generic competitive strategies require different skills and resources. In Table 1, examples of such diverging requirements for cost leadership and differentiation are given.

Firms' responses to different types of environmental pressure, and to the potential market benefits of an environmental strategy, have varied greatly. Some have just been reactive, others proactive. A well-known characterisation of firms' reaction can be found in research on corporate social responsibility presented in Table 2. This encompasses a continuum, ranging from a reactive stance, which denies responsibility, at the one end, to proactivity at the other, where managers anticipate developments. In between these two extremes, defensive and accommodative postures can be seen, characterised by, respectively, reluctant admission and acceptance of responsibility (Kolk, 2000).

Table 1: Requirements for skills and resources (Source: Kolk 2000: 80)

Cost leadership	Differentiation
Requirements for skills and resources	
Sustained access to capital	Strong marketing abilities
Process engineering skills	Product engineering
Products designed for ease in manufacture	Creative flair
Low-cost distribution system	Strong capability in basic research

Table 2: The reactive-defensive-accommodative-proactive scale (Source: Kolk 2000: 9)

Type of reaction	Posture or strategy	Performance
Reactive	Deny responsibility	Doing less than required
Defensive	Admit responsibility but fight it	Doing the least that is required
Accommodative	Accept responsibility	Doing all that is required
Proactive	Anticipate responsibility	Doing more than is required

According to the type of a firm's reaction, different environmental strategies are applied (Hart, 1997). A pollution control strategy focuses on cleaning up waste after it has been created. It is applied as the response to the command and control approach. In many cases, it causes additional costs without any economic gains. It is usually characteristic for firms having chosen a reactive or defensive strategy. A pollution prevention strategy is oriented towards continuous improvement efforts to reduce the quantities of waste manufactured and energy used. It is mainly used as a response to command and control as well as a market-driven approach. The implementation of this strategy demands new manufacturing processes supported by new machines. This strategy reduces the quantities of waste as well as improving the yield and quality of products manufactured. For this reason, both environmental and economic gains must be taken into consideration by assessing the investments supporting this strategy.

A product stewardship strategy focuses on minimising not only pollution from manufacturing but also all environmental impacts associated with the full life cycle of a product. Reducing materials consumption and quantities of waste manufactured requires fundamental changes in underlying products and process design. Investments in new machines and new designs of products are needed to achieve the goals associated with this strategy. It offers companies the opportunity to achieve economic and environmental targets simultaneously. This task demands the analysis of the total product's life cycle to find ways to minimise the environmental impacts and to provide savings through material and energy consumption, parts recovery, remanufacturing and recycling. Thus, the design includes the product's total life cycle – not just its form, fit and functions, but its disassembly, remanufacturing, reuse, recycling, and final disposal. This strategy is implemented by companies that want to have a proactive role in determining environmental standards.

A clean technology strategy is applied by companies which have their eye on the future. The existing technology base in many industries does not enable companies to

achieve environmental and economic gains simultaneously. Moreover, the existing technology base offers companies the opportunity to remain competitive by developing and manufacturing new technologies.

The choice of the appropriate strategy depends on many factors. Among the most important are companies' economic power determining their ability to purchase or develop new technologies and products as well as different types of environmental pressure (legislation, environmental accidents in other firms, environmentally related legal actions involving other firms, environmental accidents on the company premises, consumer-related and worker-related events) and the potential market benefits of an environmental strategy.

3. Environmental Strategies in Slovenian Companies

The loss of the Yugoslav market forced Slovenian companies to sell their products on the European market where competition was very keen. They recognised that they can successfully compete on highly competitive markets only through better quality of their products. We are interested in the strategy Slovenian companies apply in developing new products that will influence the quality of the environment in the future. In an empirical survey, carried out in the years 2000 and 2001, we asked managers, managers of marketing and R&D departments of Slovenian companies to select two typical new products introduced by their companies in the last five years, one a clear success and the other a clear failure. The questionnaires were mailed to 177 companies. 82 responses were obtained with required information about 82 successful and 73 unsuccessful new products. In the research, 14 success factors were included. One of them was a product advantage. It refers to a product's perceived superiority relative to competitive products. We measured this construct with 8 items. Seven of them are taken from Song (Song, 1996). Considering the influence of the product's quality on the quality of the environment, we added one more – the environmental dimension of a new product. The following items describing the advantage of new products were included:

- Compared to competitive products, this product offered some unique features to the customer.
- This product was clearly superior to competing products in terms of meeting customers' needs.
- This product permitted customers to reduce their costs compared to products they were then using.
- This product permitted the customers to do a job or do something they could not do with what was available at that time.
- This product was of a higher quality than competing products: tighter specifications, stronger, longer lasting, or more reliable.
- This product provided a superior cost-benefit ratio than competing products.
- This product had superior technical performance to competing products.
- This product was clearly superior to competing products in terms of environmental responsibility.

First, the responses on items describing the product advantage were analysed to reveal a major item defining the product advantage of Slovenian new products. The results of this analysis presented in Table 3 show that Slovenian companies have mainly developed new products in order to offer customers a superior cost-benefit ratio, unique features, and a higher quality. Because the item 'superiority in environmental responsibility' took one of the last places, the conclusion that Slovenian companies have not chosen the differentiation strategy based on the environmental dimension of the new products' quality is appropriate.

Findings by the Chamber of Commerce of Slovenia are that about 47 per cent of Slovenian companies will succeed in adopting their manufacturing processes to be able to meet the requirements of Integrated Prevention and Control by the end of year 2007, whereas the others to the end of the year 2011 also support our results (Leban, 1999). The results of our analysis are also consistent with the requirements for skills and resources presented in Table 1. Strong marketing abilities and a strong capability in basic research are probably the main obstacles for Slovenian companies to be successful in differentiation strategy.

The experience of Slovenian companies, which found that environmental attributes and the eco-label were the opportunity for product differentiation, showed that environmentally responsible products enabled them to compete on demanding competitive markets, whereas domestic customers were not ready to buy such products. Unfortunately, environmentally responsible products usually have higher prices but do not have all the characteristics of conventional products. The use of the eco-label requires that detailed warnings about the use of the product must be labelled. It causes fear among consumers that the use of the environmentally responsible products are more dangerous than the use of conventional ones. Because of all that, the quality of the environmentally responsible products are usually perceived as inferior to the quality of conventional products by domestic consumers and especially by the consumers of East-European markets.

Table 3: Mean values of ratings for product advantage items

Items of product advantage	**Means**[a]		
	All Projects	Successful Projects	Failed Projects
Unique features to the customer	1.48	2.16	0.72[b]
Superior in meeting customers' needs	1.12	1.98	0.15
It reduced customers' costs	1.11	2.09	0.03
It permitted the customer to do new jobs	0.59	1.13	-0.01
Higher quality	1.35	2.09	0.51
Superior cost-benefit ratio	1.42	2.51	0.21
Superior technical performance	1.26	2.02	0.39
Superior in environmental responsibility	1.01	1.50	0.47

[a] Mean values of the ratings for advantage items are measured on a –5 to +5 scale, where +5=strong superiority, -5=strong inferiority.

[b] Significance level of the difference in means (Success versus failures); ANOVAs, two-tail *t* test, all differences are significant at the level of 0.01.

The analysis of correlation coefficients between the item 'superior in environmental responsibility' and other items describing the product advantage was applied to find out other characteristics of quality significant for environmentally responsible new products manufactured in Slovenia. The results of this analysis given in Table 4 for the first three correlation coefficients show that the superiority in technical performance, superiority in meeting customer's needs and superiority in cost-benefit ratio have been typical for Slovenian environmentally responsible products. Taking into account all that, we can conclude that the environmental dimension has not been one of the important objectives in designing new Slovenian products, but rather it has been added as a response to the customers' or other legal requirements, and that defensive or accommodative reactions have probably been typical for Slovenian companies.

To evaluate the new product success, we applied four indicators that measured the new product profitability (three items), relative sales performance (three items), relative share performance (three items), and the degree to which a new product opened a window of opportunity for the respondent firm (two items). The first three indicators were relative measures assessed according to the success of other company's new products, competitive products, and the company's objectives.

Table 4: Relationship between the item 'superior in environmental responsibility' and other items of product advantage

Item	Pearson Correlation
Superior technical performance	0.592
Superior in meeting customers' needs	0.554
Superior cost- benefit ratio	0.536

All correlations are significant at the 0.01 level.

Point biserial correlation (PBC) between item 'superior in environmental responsibility' and a dichotomous success-failure variable is computed to reveal if the new environmentally responsible products manufactured in Slovenia are highly correlated with successful (positive PBC) or with unsuccessful products (negative PBC). Since in our case its value is 0.3 and is significant at the 0.01 level, we can conclude that environmentally responsible products are more correlated with success than with failure. Therefore, we are interested in major success dimensions which describe the success of environmentally responsible new products. The data in Table 5 can help us in finding the answer.

Table 5: Correlation between success measures and the item 'superior in environmental responsibility' of new products

Success Measure	Correlation
Relative profitability	0.403
Relative market share	0.349
Relative sales	0.337
Window of opportunity	0.297

All correlations are significant at the 0.01 level.

As the data in Table 5 reveal, every correlation was significant. Because the highest correlation belongs to profitability, we can conclude that environmentally responsible new products bring Slovenian companies profits. This finding tends to be consistent with the experience of big corporations such as DuPont, IBM, Xerox and others.

Taking into account the fact that Slovenian companies also use the ISO 14001 Certificate to inform their consumers about their environmental behaviour, the following hypothesis was tested:

H1: The importance of an environmental component of new products developed by companies with ISO 14001 is higher than by the companies without this Certificate.

The analysis of mean differences belonging to the item 'superiority in environmental responsibility' for the companies with and without the ISO 14001 Certificate shows that mean differences are not significant. This analysis does notsupport the hypothesis *H1*. This statement allows us the conclusion that even companies possessing this Certificate have not created a competitive advantage with quality based on the environmental dimension.

4. Conclusions

The results of the study presented in this paper show that most Slovenian companies have not developed new products superior in the environmental dimension. Rather, they compete on the superior cost-benefit ratio or other unique attributes. The information that the importance of the environmental component in achieving the competitive advantage of new products takes one of the last places allows us the conclusion that Slovenian companies have not engaged in the product stewardship strategy in designing the quality of new products in spite of the profitability of environmentally responsible products.

Rather, they have reacted accommodatively or defensively and have not in the least done what is required to meet environmental requirements on foreign markets. The findings obtained by this empirical research are consistent with the fact that only five Slovenian products manufactured by two producers have the right to apply the German eco-label (Podpečan, 1999). The number of companies with the ISO 14001 Certificate is increasing, but the results of our study show that even these Slovenian companies have not yet promoted the development of environmentally responsible new products.

The findings of research carried out by Kos (1999) show that the common characteristic of countries in transition is that the value added is stagnating at a level that is only a fraction of that in the EU. Competitiveness is attained only by low prices and not by new designs, product innovation or new manufacturing methods. One of the important reasons for that is the technological gap between the transition countries and their counterparts in the EU. The other reason can be explained by a high percentage of costs due to the consumption of materials, components, and energy purchased from external suppliers.

Slovenian companies will have to invest in new technologies if they want to compete on the demanding markets. The investment in new technologies will enable them to reduce the consumption of resources and to contribute to the quality of the environment.

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Jan Fiedler*

The Economics of Renewable Energy Sources in the Czech Republic

Abstract: This paper analyses the economic potential of the renewable energy sources compared to fossil and nuclear fuels. It compares the structure of the primary energy sources consumption in the world scale to that of the Czech Republic.

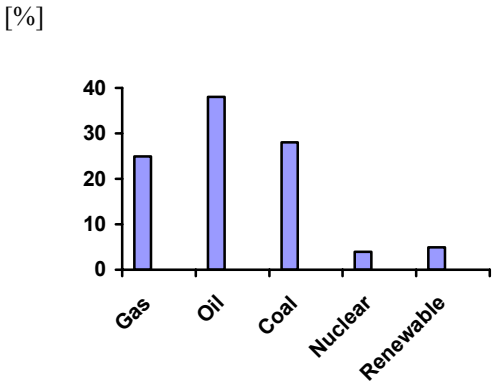
In table form are displayed production and specific investment costs for selected technologies of electrical energy production: wind, solar and hydro power plant, biomass fuel power plant and coal fired power plant, nuclear and combined cycle power plant. Conditions for application of the renewable sources are specified in comparison with fossil and nuclear fuels. In conclusion are described future possibilities of the renewable energy sources utilisation in the Czech Republic.

Introduction

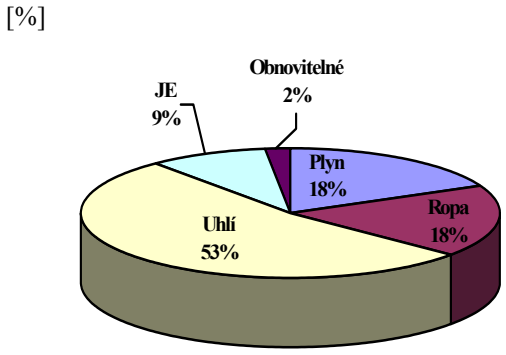
The primary power sources are traditionally divided into two groups:

- Non-renewable energy sources consumed once and for all after a certain period of time.
- Renewable sources will be permanently at disposal (throughout certain development stage of the Earth).

Distribution of world primary energy sources consumption in the year 2001 is displayed in *Picture 1* and the state of consumption in the Czech Republic is depicted in the *Picture 2***.** From the pictures it is evident, that the major proportion in the consumption has been from non-renewable sources, mainly fossil fuels (coal, oil, natural gas).



Picture 1: Consumption of the primary energy sources in the world in 2001



Picture 2: Consumption of the primary energy sources in the Czech Republic in 2001

* Doc. Ing. Jan Fiedler, PhD, Institute of Power Engineering, Faculty of Mechanical Engineering , Brno University of Technology, Technicka 2, 616 69 Brno, Czech Republic, Fax: ++ 420 541 143 345, e-mail: fiedler@eu.fme.vutbr.cz

Why are renewable energy sources given social importance and technical and financial support, their proportion in the consumption of primary sources? The reason is mainly their neutral contribution to the production of CO_2 (carbon dioxide) and the efforts to find alternative energy sources, that is, in order to have solutions in the case of depletion of fossil fuels. Usually their eco-friendliness and positive impact on the environment is also mentioned. These medially grateful themes don't often have rational explanation.

Increasing the proportion of the renewable energy sources in the total consumption has been agreed upon by the world (for example "World Conference on Climate changes" – Kyoto, Japan 1997) and by Czech Republic (for example "Energy Policy" – Government decision of the Czech Republic Nr. 50/2000). The Government's decision and signed protocols are one aspect of the problem; practical realisation of the same is another. For example, in the above mentioned Government decision, is introduced an increase in proportion of the renewable energy source in the total primary energy sources consumption in the Czech Republic: six per cent till the year 2010 and eight per cent till the year of 2020. If we compare this target with the information in picture 2, the problems to be encountered are apparent.

Increase in the proportion of the renewable sources has its possibilities and utilisation limitations, which can be, in general, divided into three groups:

- *Technical*: Existing design solutions, technology, and materials for realisation of renewable power generation systems. Physical limitations (surface energy density, solar radiation intensity, direction and speed of wind, flow and river gradient)
- *Economic*: Investment and power generation costs of technology utilising renewable energy sources, price of energy, annual period utilisation, investment repayment time, etc.
- *Public, social, political*: Laws, regulations, standards, tax, and grant politics, public opinion, election programs of political parties and unfortunately also pressure from militants.

Whereas values for the first two groups can be quantitatively expressed and evaluated, the third group which involves estimating, forecasting, and speculating emotions and craze without any rationality. Further this paper deals only with the second group.

Economic possibilities of renewable energy sources

To enumerate initial outlays and costs for running individual systems for utilisation of the renewable energy sources it is necessary to set certain reference technology. For example, biomass, which is a renewable source, can be transformed to thermal energy by burning. The heat can be used for steam production and can produce electric energy through steam turbine. The biomass can go through gasification or by use of wet processes such as aerobic or anaerobic fermentation, and be converted into different fuels (process gas, alcohol, and methane). It can then fire different heat machines. The reference technology chosen is electric power generation from various

primary sources using the simplest and practically feasible system for the power plant of the given type. Economic data, characterising electric power generation, are in the Table 1:

Table 1: Economic data, characterising electric power generation

Power plant type	Power generation costs [Kc/kWh]	Specific investment cost [Kc/kW]	Total efficiency [%]	Surface energy density [kW/m^2]
Wind	5 - 30	50 000 - 100 000	40	3 - 5
Photo solar cell	10 - 45	120 000 - 200 000	5 - 18	0,10
Thermo solar	9	65 000	15	0,16
Biomass fired	2,20 - 6	36 000 - 50 000	15 - 30	N/A
Hydro	0,30 - 2,50	30 000 - 50 000	75	N/A
Coal fired	0,70 - 2	40 000	35 - 48	500
Nuclear (PWR)	0,50 - 1	50 000	32	650
Steam-gas combined cycle	1,50 - 3	20 000	53 - 58	700

- Comparing different technologies, electric power generation has the most suitable output, and the incurred costs or the specific investment costs can be easily expressed in Kc/kWh.
- The ratio of the usable energy from the system, in this case electric, to primary input energy is called total efficiency. Total efficiency expresses the quality of transformation and is an important technical and economical indicator of primary source utilisation. Naturally, it is always limited by physical laws.
- An important economic parameter for source comparison is surface energy density. This is how large an area the system of a certain outlet output occupies. It is important to know this value for choosing the construction location (purchase price of the real estates).
- The bottom portion of the table displays economic data of classic energy systems for electric power generation, using not renewable energy sources (fossil and nuclear fuels).
- Economic data are for easier presentation in Czech crowns (Kc) but can be enumerated in USD (US Dollars) or EUR. Markets with energy technology are global and in some cases producers of the appropriate system do not even exist in the Czech Republic. Also, markets with the final product, electric power, are international.

Reasons for current low usage of the renewable energy sources in the Czech Republic

- Renewable energy sources are dependent on natural conditions, which limit the annual period utilization of the source. Moreover, the quantity of energy acquired over the year (with a short annual period utilization of the energy source, increases the specific production costs). Here belongs, for example, change of seasons, day/night, average time of direct sunshine, atmospheric air circulation, etc. In some cases, natural conditions do not allow the use of certain technology. For example, geographic location (growth of biomass) or broken terrain (construction of water supply systems). On the other hand, power plants that use fossil or nuclear fuels in these conditions are practically independent. Their annual period utilization is only given by economic factors (regulation of electric system).
- Renewable energy sources are problematic from the point of view of reliability of power supply and control of the electric system. For an installed output in the renewable sources (wind, water, solar power plant) must exist reserve fossil fired power plant, there should be contracted power supply in case of renewable power source failure in case atmospheric conditions fail. Purchase price of electric power from renewable sources can be reduced by the price of system service due to this reason. This disadvantage can be eliminated by price of higher investment costs of accumulations (for example, pump storage hydro power plant).
- Volume density of renewable energy sources is very low compared to the fossil and nuclear fuels. For example, solar radiation intensity in the Czech Republic is only a maximum of 0.9 kW (June). This means we can get 0.1 litres of bio-oil (rape methyl ester) from 1 square metre of rape field, but only once a year. By volume, one litre of compressed biomass (straw, crushed tree branches) after burning represents approximately 4.5 MJ of energy. Whereas one litre of mineral oil-fuel represents nearly ten times more (39MJ).
- The transport and storage costs of some renewable energy sources considering their low density, is a significant economic load.
- Renewable energy sources represent only a small segment of the power-producing industry (see Picture 1 and 2). Specific investment costs for individual plants must include **R**esearch, **D**evelopment and **P**roduction (RD and P) costs in the installed outputs per year. Fossil and nuclear sources have a higher specific price of system compared to conventional sources.

Do the renewable energy sources pay off?

From the economic perspective, under which conditions can renewable energy sources compete with non-renewable sources? They would be able to compete when all other costs would be added to the other energy sources, which would create the "total price" of energy. Among these costs belong:

- Costs for discharging the greenhouse gases and CO_2 into the atmosphere; carbon tax, concerning all fossil fuels.
- Costs in the whole energy chain for all energy sources (renewable and also non-renewable): securing raw materials, processing, technology of power generation including the emission load of the source (SO_2, NO_x, radioactive materials), storage and waste disposal, and effacement of the consequences of the mining. At present, costs for only nuclear energy sources have been ascertained in this manner.
- Costs for protection of the energy sources. For example, securing crude oil mining safety in area of strategic interest to US military, has been reckoned 10USD/barrel. These costs are not included in the present price of crude oil.
- Setting up of law relief and incentives for various energy technologies on the on basis of majority opinion in the state. It must not be only the question of pressures by particular lobbies.

Possibilities of utilization of the renewable energy sources in the Czech Republic

Possibilities are limited not only by natural and technical conditions, but also by deformed price environment in the power engineering sector. Only privatisation and complete liberalization of this branch will remove hidden grants in some sources.

Considering the geographic location of the Czech Republic and historical traditions it can be expected that:

- Utilization of water energy, which nowadays is the most dominant of all renewable energy sources. Water power plants had been historically used in the Czech Republic in more than 11,000 localities. Nowadays all locations are for construction of big hydropower plants. The total installed output of hydropower plants is nearly 2,000MW. Considering limited gradient and flow of the rivers in the Czech Republic more can not be expected. Big hydropower plants exist only for studies on pump storage hydro power plants with outlets in hundreds of MW on smaller water-courses. Construction and operation of small hydropower for local electricity supply networks. For regulation of electrification system there are small hydropower plants of no importance. They are flow plants, whose flow (and also capacity) are given by the hydrological situation in the river-basin without any possibility of regulation. Nowadays, almost 1500 localities are registered with the average capacity of installed turbines being tens of KW.
- Biomass treatment for power production reasons: The biggest possible increase of renewable energy source consumption is form biomass. The total acreage of agricultural land in the Czech Republic is more than 4.2 million hectares. About 3 millions hectares is sufficient for food production. Utilization of land for energy plants help to solve two problems of Czech agriculture at the same time: food production excess and unemployment in the sector. Besides, the energy plants in agriculture and wood-work industry are an important source of waste biomass usable for power production. Technology for energy utilization of biomass is known and Czech Republic has experience with some of them

(burning, partly gasification, distilleries, synthetic fuels, etc.). Biomass is also a home-made source of energy, whereas all liquid and gas fossil fuels need to be imported. This way the commercial balance of state (foreign trade gap) is handicapped. Expansion of biomass energy utilization has been hindered deformed price of basic gas, liable to state regulation.

- Solar energy: Its utilisation has only seasonal value in our terrestrial latitude. It is suitable for local, low potential heat generation (e.g., heating in the spring and autumn).It is not appropriate to compare solar radiation intensity with commercial electric power generation.
- Wind energy has its own limitations. According to long term measurements at 300 weather stations of Czech Hydro Meteorological Institute (CHMI). Only six stations have average annual wind speed higher than 6 m/s. Commercially usable wind-turbine power plants have a unit capacity of 300-500 KW are optimised for a wind speed of 8-12 m/s. Perhaps, smaller units can be locally used for public energy systems.

Conclusion

Renewable energy source utilization is dependent on the overall economic situation and legislations of every state. According to the experience of the EU nations, which the Czech Republic has joined, coexistence of various energy sources on the basis of economic convenience of every concrete source in particular market segment is possible. Renewable energy sources are understood as eco-friendly. For ecological politics and support of renewable energy sources use, every nation can reserve as much funds, as allows its state budget. Richer can allot more, poorer states less, or nothing. This is the basic condition for the utilization of these sources. When public order in the form of democratic vote prefers minimum pollution, independence from raw-material import or landscape conservation, these could be accounted from tax relief and grant politics. Then renewable energy sources could become competitive on the open energy market.

Part 7

Technological Issues and Opportunities

Zinaida Klestova, Alexander Makarenko, Eugene Samorodov*

Geoinformational Systems in society Transformation. System Analysis and Transregional Infrastructure

1. Introduction

All informed representatives may recognize the importance of the sustainable development (SD) concept. Some issues concerning SD have previously been formulated, but as a ruling principle, it was proposed in Agenda 21 in Rio de Janeiro (1992).

However, it should be stressed that despite many meetings, congresses and discussions, the situation hasn't changed, at least globally. Sometimes the resistance is explicit, as in the cases of nuclear fuel waste (global level) or car washing in rivers (local scale). The difficulties are intrinsic and originate in the lack of general scientifically-supported programs for SD. There are several reasons for such difficulties, but the main one is the complexity of large social, economic and ecological systems. Such complexity is frequently not perceived by adherents of SD, who often expect immediate positive effects. The problems of sustainable development therefore require deep theoretical and applied research.

This necessitates the application of general system analysis established in part by Ludwig von Bertalanfi (Bertalanfi, 1968). At first, the main notions of general system theory were developed. These include the consideration of the large system as a whole object, the hierarchical structure, and the erasing of new quality in a system with a large number of elements. Further, system analysis accumulates the ideas of dynamics (development) and extracting the object from the environment (Francois, 1999).

System analysis (just as other sciences) is currently at a new stage of development. This stage is closely connected to the post-industrial development of society, with the leading role being played by information technologies. The human being has become the main subject and object of information technologies. Recent system analysis should incorporate within its framework consideration of the living system in connection with the environment, investigation of the intelligence aspects of system elements, the observer role, self-referencing and anticipatory property, consciousness, adaptation and learning problems.

* Klestova, Zinaida, Dr., Institute of Veterinary Medicine of Ukraine, Donetskaya st.30 , 52151 Kiev-151, UKRAINE & National Technical University of Ukraine (KPI), Institute for Applied System Analysis, Kiev, Ukraine. E-mail: zklestova@yandex.ru.

Makarenko, Alexander, Prof. Dr., National Technical University of Ukraine (KPI), Institute for Applied System Analysis, Pobedy Avenue, 37, 03056, Kiev, Ukraine. E-mail: makalex@i.com.ua.

Samorodov, Evgeniy, Dr., National Technical University of Ukraine (KPI), Institute for Applied System Analysis, Pobedy Avenue, 37, 03056, Kiev, Ukraine & Intellectual Systems GEO Ltd, Kiev, Ukraine. E-mail: esamor@isgeo.com.ua.

As far as sustainable development problems are concerned, it follows that system analysis methods should be developed for all levels of hierarchy in nature. Principles and models proposed by authors (Makarenko, 2000; 2001) provide essential help in the consideration of such problems. Such ideas have already been developed for sustainable development problems at global and regional levels (Makarenko, 1997; Klestova et al, 2000; Makarenko & Samorodov, 1998).

In the present paper, the authors propose that the results of the system analysis of sub-systems of society are potentially important for sustainable development problems. Such sub-systems are, namely, computer geoinformational systems (GIS). In the research on SD, such GIS may serve as monitoring tools, learning and decision-making devices and society-transformation media. Note that in GIS, the data is served in electronic formats where the information is linked to the physical coordinates of geographical and administrative objects. Some results of GIS building in Ukraine are proposed, and a possible role of Ukraine in the development of sustainable development including the Danube region is considered.

2. GIS as an informational tool for society transformation.

Right from their origins, computer geoinformational systems (GIS) have been useful tools for representing large volumes of information. More intriguing, however, is another aspect of GIS in large social systems, namely the increasing influence of GIS on the social processes, decision making, information and PR technologies, education and management. In part, it is connected with the depiction of digital databases (tables, fails) in visual (cartographic) types.

The next key factor is the development of access to the personal computer. The Internet and other networks support elaborate information and communication infrastructures. The interfaces of GIS have become increasingly flexible and adjusted to the information consumer. We may anticipate that in the very near future, the interfaces in ‘professional’ GIS will be familiar with it in computer games.

The third factor in the development of GIS is that society will become post-industrial, with information technologies (IT) playing a key role, thus expanding the area to be investigated for GIS influences. The problem concerning the optimal exploitation of GIS by the IT component will also be developed. Investigations are (from the author's point of view) currently at the initial stage. The role of GIS will also expand in the context of distance education, e-commerce, orientation systems such as GPS, satellite communication, etc.

Recently, the role of GIS as a factor in the transformation of society has been underestimated. The possibility of using GIS should also change the life of the average person. For example, ecological problems, health risks, transportation expenses, the plans of buildings and other factors can change the prices of the land and the quality of life.

All these problems have been interesting and important for western European countries in the recent period of transition. However, they are especially important for eastern European countries, in particular for Ukraine. It can be noted that although GIS are now in use in some official organizations, use by the population at large is

only in the initial stage. The electronic maps of some large cities (Kiev, Lviv) are an exception. The result is a lack of the necessary information on many key problems, and what follows is that opinions on many problems are unstable and emotional. The list of such problems includes the following: the enlargement of NATO and the position of Ukraine, World Bank operations, globalization, the capitalist form of development, pension reform, health care, the consequences of the Chornobyl catastrophe, the future development of Ukraine, and the ecology of the country and of local regions.

Analysis of current affairs in such issues and of the prospects of GIS lead to the conclusion that for all the above issues, the GIS application should have a unique typical structure, with the differences being mainly in specific data bases, networks for information spreading and target audiences.

3. General questions of GIS building and applications

The number of aspects is enormous (see also Klestova et al, 2001). Detailed description and investigation must be dealt with specifically in more extensive publications.

Examples of problems are as follows:

- Who (person or organization) are the decision makers with GIS assistance?
- Who are the consumers of GIS-prepared information?
- What are the space and time scales of influence of the given GIS?
- What problems (and in what time scales) fall within the competence of GIS?
- What are the best ways of developing GIS technologies in different networks of society?
- Interaction of classical recent GIS with modelling and prediction.
- The description and modelling of large-scale GIS as large socio-economic systems in interaction with society.
- Probabilistic and multi-scenario aspects related to GIS technologies.

The approach developed by authors since 1990 in modelling large socio-economic systems (Makarenko, 1998, 2000, 2001) may also be useful for the problems listed above. It can be noted that such an approach has already been developed for geopolitical prediction, epidemiology and sustainable development. Of course, GIS-connected applications require special development and may constitute the issues of separate research works.

4. Some experience of GIS building for Ukraine and GIS-based investigations

In this section, we very briefly describe some of the practical applications (different from those remarked on in section 3 above) received in the fields of GIS technology for the Ukrainian task (Atlas, 1999, 2000).

4.1 GeoEMIS overview

During the last few years, a specific class of information systems, designed for operating with spatial data - GIS - has widened considerably. Intelligence Systems GEO, Ltd. represents the Environmental Management GeoInformation System GeoEMIS, a process-oriented GIS intended for the automation of activities with regard to ecological management:

planning, organization of collection and collection of data concerning pollution, natural resources and economics,

data accumulation and organization in databases and data banks (DB i DBn),

data manipulation, analysis and processing, and

preparing, making and implementing decisions concerning the protection and optimal use of ecosystems.

GeoEMIS is oriented to support both strategic and urgent decisions. GeoEMIS consists of the program products and functions listed below, with the sub-systems GeoRegisterE for the input and georegistration of ecological data and GeoIntegrator for the integration of ecological data. It is intended for data geointegration on different levels of information processing to enable the complex analysis of polluted areas and to provide analysis results for management decision making.

4.2 Basic geoinformation sub-system GeoBIS

This is intended for information support in making decisions with regard to minimising the after-effects of the Chornobyl catastrophe, as well as radiation-monitoring functions. This sub-system enables various possibilities in terms of the manipulation, analysis, processing and representation of data in tabular, cartographic and graphic forms.

4.3 Cartographic data viewer GeoViewer

This is intended for the effective management of spatial data. It gathers all operations with cartographic objects in a joint cartographic interface and processes cartographic data bank management functions. Independently of the cartographic tools (MapInfo, MapX, MapObjects, ExcelDataMap, ArcView), users can access common map-viewing functions such as map object selection, thematic map building, procedures of maps and acceptance of separate layers, registration, storage, search and distribution.

4.4 GeoEMIS program products

GeoProject is a sub-system for information support in preparing management decisions. It was created for information support in making strategic decisions when planning and completing the long-term effects on ecological systems.

GeoInspector is a sub-system for information support in making urgent decisions in emergencies. It was created for information support in making the urgent decisions required during emergencies such as floods, fires, the release of pollutants by chemical plants, etc., in particular when arriving at sites in the event of an emergency and the established conditions of water use have been violated.

4.5 GeoModeller

Development of this sub-system is in the research stage. GeoModeller is intended to support the resolution of problems of GIS integration with

- systems of highly graphical analysis of pollution data,
- systems of highly statistical analysis of pollution data,
- systems of modelling of pollutants transfered in ground, air, water, etc., and
- systems of multi-criteria estimation.

4.6 Administrative and economic data registration sub-system GeoRegisterA

This is intended for the registration of the administrative and economic data of spatial objects and includes data concerning titles and owners.

4.7 GeoEMIS information products

4.8 Integrated ecological data bank

This data bank contains the following data:

- single and aggregated measurements of the contamination of the environment (ground, water, air) and foodstuffs (milk, potatoes) with radionuclides (^{137}Cs, ^{90}Sr and others),
- the contamination of arable land and woods with radionuclides ^{137}Cs,
- single and aggregated measurements of the equivalent equilibrium of the spatial activities of radon in the air within accommodation units,
- exposure doses obtained of thyroid for children of different age groups (thyroid dosimetry), and
- single and aggregated measurement data as to the internal exposure of human beings.

4.9 Spatial data bank

This data bank contains the following data:

- fields of radionuclide contamination with ^{137}Cs in Ukraine,
- land occupation and land use for separate areas of Ukraine,
- vector topographic maps of Ukraine M=1:1000000 and M=1:500000,
- vector-raster topographic maps of Ukraine M=1:200000, in addition M=1:50000 for selected areas,
- vector-raster topographic maps of selected Ukrainian towns both M=1:5000 and M=1:2000, and
- data available in Ukraine as regards remote sounding.

4.10 Administrative and economic data bank

This data bank contains the following data:

- administrative territorial division of Ukraine (regions, districts, local Soviets, populated units, vicinities of towns),
- demographic data on population structure for various years,
- normative data, and
- economic data.

4.11 The theoretical basis of GeoEMIS

The presented program and information products of GeoEMIS are the components of Environmental Management GeoInformation Technology (GeoEMIT), which automates Environmental Management GeoInformation Methodology (GeoEMIM). GeoEMIM is being developed for the information support of activities performed in the course of environmental management. The fundamentals of GeoEMIM were performed in order to minimise the impact of the consequences of the Chornobyl catastrophe.

GeoEMIMs are created as real world simulators and used as instruments for the empirical research of ecosystems. The principal stages of empirical research are the initial system definition, data collection, data processing, and interpretation.

4.12 Examples of GeoEMIS usage

Economic estimate of ecosystem state.

When an emergency occurs, urgent decisions are required, which means that the reception and analysis of information must be as fast as possible. Amongst other data, it is necessary to have an estimate of the economics of the situation, in particular, the size of the loss in terms of nature (e.g. area) and money. Using GeoEMIS, the process of loss determination consists of the following four steps:

- reception of remote sounding,
- preparation of map showing situation, using data pre-processing procedures,
- input of spatial and attributive data into sub-system GeoInspector,
- determination of area of polluted territory and calculation of losses.
- Combined report on the state of the ecosystem
- The Ministry of Ukraine of Emergencies and Affairs of Population Protection from the Consequences of Chornobyl Catastrophe often receives letters from the population requesting explanations of regulations concerning pollution in their region. Using GeoEMIS, the preparation of responses takes very little time.
- Influence on ecosystems through the mechanism of differentiated taxation
- GeoEMIS provides information tools enabling the ecosystem to be influenced by economic methods, in particular through the mechanism of differentiated taxation. The taxation level is determined by means of the following steps:
- viewing of the territory using GeoBIS, creation of pollution map,

- determination of the most-polluted plots of land or selection of plots of interest,
- ascertainment of the owners of selected plots using the sub-system GeoRegisterA,
- determination of taxation levels based on normative and economic data.

The authors collaborated with such well-known Ukrainian organisations as the Ministry of Ukraine of Emergencies and Affairs of Population Protection from the Consequences of Chornobyl Catastrophe, MinEcoSafety, MinStatistics, MinEconomics, Main Administration of Geodesy, Cartography and Cadaster, Ukrainian Mobile Communication, Ukrnafta, Academia of Science of Ukraine and Academia of Agriculture Science of Ukraine and others, as well as with some foreign firms.

5. Conclusions and prospects

In the proposed present report, the authors describe some general aspects of developing a sustainable development approach. As one of the components of SD, we investigate the geoinformational systems and some research problems concerning GIS development, applications and the understanding of their possible role in the reconstruction of society. Such issues may constitute the basis for collaborative investigations and projects.

In addition (see section 4 above), there is a detailed description of some developments which have already been put into practice in the governance of Ukraine. This section is of interest, not only in the sense of providing information on programs and databases. The authors hope here to have provided a set of practical tools which may be exploited for practical goals in other countries. This is because the approaches are based on standards for west European software and formats, which makes it easy to adapt them to domestic conditions.

One possible area for collaboration is the Danube region, which also includes Ukraine. For example, we already have some background on preparing projects on the ecology of the Danube region and on water management. Other possible topics for collaboration are health care, emergency preparedness and veterinary medicine, both within a state as well as transboundary aspects thereof (see also Kubushina et al, 2000; Klestova & Makarenko, 1998; Teplice, 2001; Klestova et al, 2001).

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T. Abadjieva*

Effect of Solar Radiation on Materials and Design of Buildings in Botswana**

1. Introduction

Botswana is a semi-arid country. The climate can be classified as hot and dry due to generally warm winters and hot summers. The terrain is a predominantly flat to gently rolling tableland with the Kalahari Desert in the southwest. The average daily amount of solar radiation on horizontal surfaces is very high – around 26-28 MJ/m^2 (for December) and around 15-18 MJ/m^2 (for June). The priority, therefore, is how to keep the buildings cool on the inside.

Traditional houses in Botswana are rondavel. The low walls, surrounding the family compound keep the dust out while permitting the cool breezes to circulate over the top. The rondavel's cylindrical form reduces the building's surface area, exposed to the sun's rays. The thatched roof is a very good insulator against the high overhead sun. Dense mud block walls keep the interior cool. Small window openings in the exterior walls do not let in much sunlight.

However, with the global changes and rapid expansion of the population, new types of building forms and materials were introduced. Many houses were built without proper orientation, without overhangs to shade windows adequately, and using corrugated metal roofs without ceilings. This has created thermal conditions of great discomfort in many dwellings.

Thermal comfort in buildings, therefore, is a critical issue which must be addressed by building designers and policy makers.

The purpose of this investigation is to study the effect of solar radiation on building materials with a special emphasis on factors affecting orientation, planning, and design of buildings considering the semi-arid climate in Botswana.

2. Climatic factors affecting performance of materials, forms, and orientation of buildings in Botswana

2.1 Sunshine and solar radiation

The amount of solar radiation, available in Botswana is very high. The annual duration (daytime) of sunshine is 9 hours or 75 % of the day-length. The amount of solar radiation that falls on a surface facing the sun is an average of 6.5 kWh/m^2/day. Over a year, the amount of solar radiation is 8.2 GJ/m^2 or 2300 kWh/ m^2.

Both, the building form and orientation, will affect the amount of solar radiation received on different building surfaces at different times of the day and the year. Absorbed solar radiation will then result in heat gain of the building affecting thermal

* Dr. T. Abadjieva, University of Botswana, Private Bag 0061, Gaborone, Botswana

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comfort and/or the heating/cooling load on the building. In order to maximize the usefulness of night sky radiation, a building should have near horizontal roof with the largest surface area possible.

2.2 Maximum and minimum temperatures, temperature difference

The highest mean monthly maximum temperatures range between 32^0C and 35^0C, the highest maximum ever recorded being 43.9^0C, at Gaborone. The lowest mean monthly minimum temperatures are recorded in July and vary from 2^0C to 5^0C, the lowest minimum temperature ever recorded being 15.2^0C, at Tsabong.

The most notable feature about the pattern of outdoor air in Botswana is the very large difference between the high and low temperatures. In the summer, the average temperature difference between day and night is 16.3^0C, and in winter it is 20^0C. In the cold months, the outdoor temperature will often rise to 25-28^0C. These differences are a great source for natural heating and cooling of buildings.

Diurnal variation of temperatures helps to heat or cool a building largely through the controlled exchange of indoor and outdoor air. Consequently, the primary concern here with respect to the building form and orientation is to achieve optimum levels of controlled ventilation.

2.3 Ground temperatures

The temperature just below the surface is relatively constant from day to day. The small periodic fluctuations of soil temperature are caused by the daily and yearly variations in solar radiation received on the surface of the earth. Therefore, thermal connection between a building and the ground can usually help to moderate temperature extremes in the building. In order to maximize the usefulness of ground temperatures, a building form should have a higher surface area in contact with the ground.

2.4 Humidity of the air

Humidity of the air in Botswana is relatively low. The mean monthly relative humidity is maximum during the period January-March (between 30-50 %, measured every 14 hrs) and minimum (between 19-28%) during the period August-September.

2.5 Wind velocity and direction

Wind velocity is highly variable in Botswana. Generally, the highest wind speeds are recorded in October: between 2 m/sec and 2.8 m/sec. The wind velocities are reported at a height of 2 meters, as it would be the typical height, at which wind would strike a building.

Wind direction is important in order to use wind for natural ventilation to keep the building cool. About 50 % of the time, in January (the hottest month), the wind comes from the south, and about 30 % of the time from the east.

Wind is the major driving force in providing natural cooling of buildings in Botswana and accordingly it should be a major determinant of building form and orientation.

2.6 Occurrence of frost

Air frost occurs when the temperatures fall below 0^0C, and the ground frost occurs when the temperatures fall below 3^0C. The main period of frost occurrence is between June and August, particularly in the southern and western parts of the country after passage of cold fronts.

2.7 Rainfall

The mean annual rainfall in Botswana varies from a maximum of over 650 mm in the extreme northeast to a minimum of less than 250 mm in the extreme southwest. A rainfall study indicates that much of the rainfall occurs in short spells of high and very high intensities in short time periods.

Water is a scarce commodity in Botswana. In order to make the best use of rainfall in water catchment designs, the building form should maximize the roof area and provide it with a tilt to the collection system.

2.8 Vegetation

Vegetation can be a powerful source of cooling the building by providing a shade from solar radiation, help to channel winds, and to reduce noise and windborne dust.

3. Overview of cooling strategies in the design of buildings in Botswana

Cooling strategies include resisting heat gain of the building, while resisting heat loss. Table 1 suggests the following cooling strategies [1], which could be used for designing buildings in Botswana:

Table 1: Cooling strategies

No	Cooling strategy	Action
1	Minimize solar gain	- Minimize the amount of solar radiation directly entering the building. - Minimize the amount of solar radiation absorbed on the outside of the building, which can be transmitted inside through the walls and the roof to inside.
2	Promote ventilation	- Promote wind driven ventilation. - Use forced ventilation with fans.
3	Minimize conductive heat flow from outside	- Insulate roof. - Insulate wall.
4	Promote contact with the ground	- Use higher surface area of building in contact with the ground.
5	Minimize infiltration	- Lower controlled air leakage through the house.
6	Promote radiant cooling	- Use good radiator as a roof material.
7	Use thermal mass	- Use massive walls and/or roofs to retard heat gain.

4. Overview of heating strategies in the design of buildings in Botswana

Heating strategies try to promote heat gain to the building, while promoting heat loss. Table 2 suggests the following heating strategies [1], which could be used in building design in Botswana:

Table 2 Heating strategies

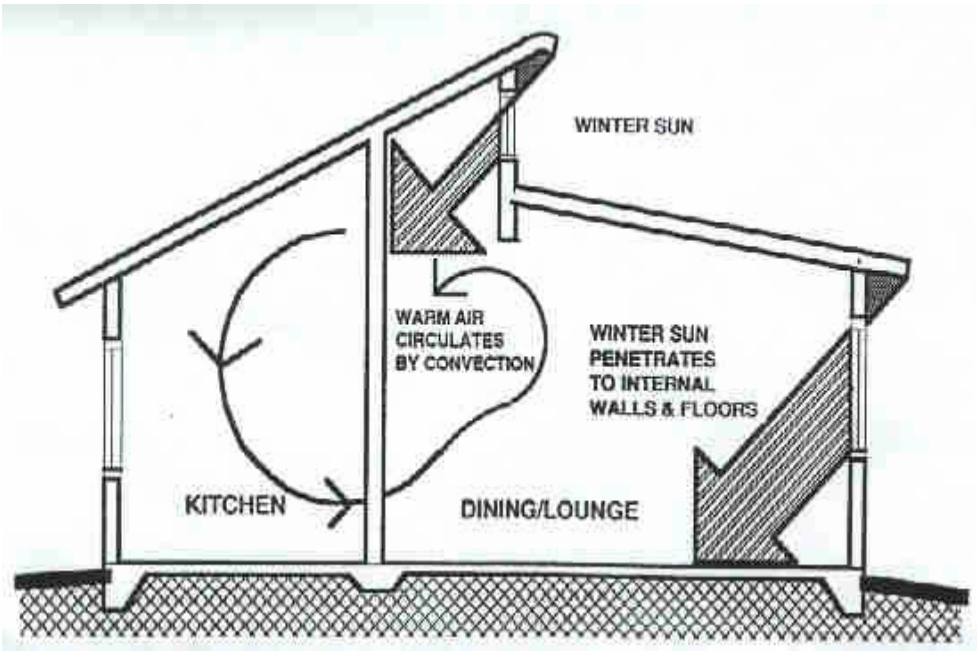
No	Heating strategy	Action
1	Minimize conductive heat flow outside	- Insulate roof. - Insulate wall.
2	Minimize infiltration	- Lower controlled air leakage through the house.
3	Promote solar gain	- Increase the amount of solar radiation directly entering the building. - Increase the amount of solar radiation absorbed on the outside of the building, which can be transmitted through the walls and the roof inside.
4	Use thermal mass	- Use thermal mass inside the house for heat storage of solar gain. - Use thermal mass in walls, floors, and/or roofs to store heat gain and release it inside at night.

5. Climatic responsive design of a residential house – typical sections

The following suggestions might be considered using principles of energy efficient solar design:

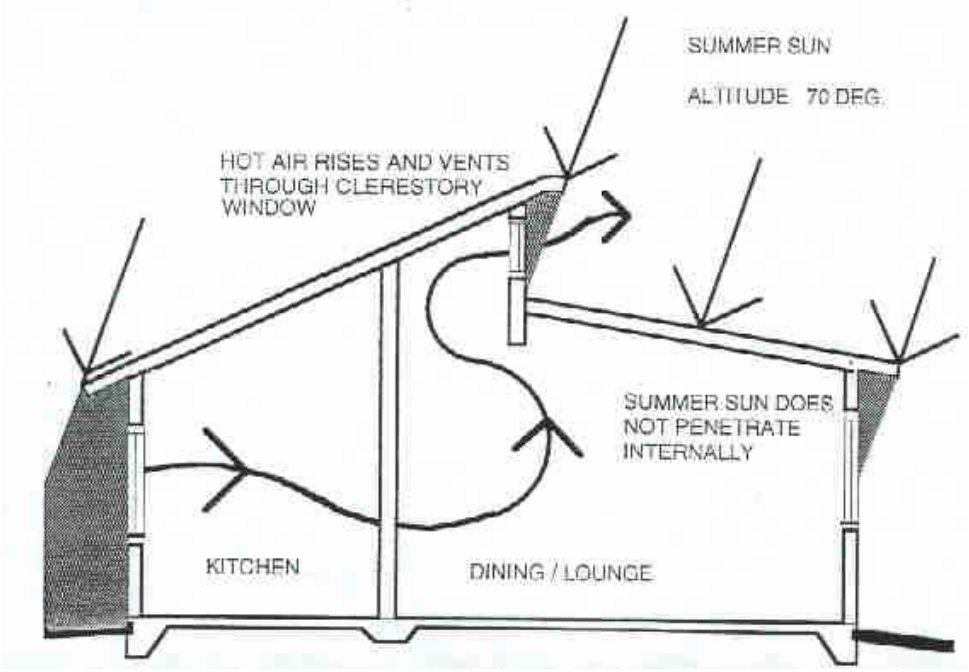
- **Implementation of clerestory windows, facing north.** During the winter months, the sun enters directly into the center and rear portion of the house (Fig. 1). This greatly increases the direct solar gain and warm air circulates by convection. During the summer months, the glass area in the clerestory does not receive any direct sun (Fig. 2). During the night, when the lower windows are open, cooler air enters the house, allowing hot air to rise and go out through clerestory windows.

Figure1 Typical section showing winter conditions



- **Selection of suitable building form and appropriate orientation of the building to the sun.** Placing the building correctly with regard to the sun has the effect of maximizing solar heat gain in winter and minimizing it in the summer. As a result, such buildings tend to have short lengths of walls to the east and west, where the long angle sun is strongest in summer. In winter, the north wall catches most of the sun, whilst a normal length roof overhang will shade the north during a summer day.
- **Arrangement of windows.** Windows are the most effective means by which heat from the sun can enter a building due to greenhouse effect. By placing the majority of windows on the north wall, the warm sun will enter the building in winter but not in summer. By not placing the windows on the east or west wall, the low angle summer sun will not penetrate into the building.
- **Insulation.** External walls and roofs of buildings, if insulated, will slow down the transference of heat into and out of the building. This will do a lot to stabilize the temperatures inside the building. In Botswana, insulation of the roof is the most effective means of cooling the inside of the building, as most of the solar radiation falls directly on the roof, particularly in summer. This insulation also helps to stop heat escaping from the building in winter, especially at night.
- **Thermal mass**. Internal walls, built of dense materials, such as brickwork, will help to stabilize temperatures inside the building.
- **Landscaping.** Landscaping can be effectively incorporated into and around the buildings not only to shade them, but also to create a pleasant micro-environment around the building.
- **Natural ventilation and grouping of buildings.** To properly design a building utilizing natural ventilation, one needs to examine the local conditions and weather data, particularly where the prevailing wind is coming from and how the placement of the building will affect it. It is important to assess the effect of the arrangement of the surrounding buildings as one building can create a shadow or wind tunnel for another.
- **Ventilation openings.** The position of ventilation openings, such as doors and windows, also needs to consider the direction of the prevailing breeze to optimize cooling of the building. In Botswana, the use of time ventilation to remove heat built up during the day can be most effective in keeping temperatures inside the building comfortable. High-level openings help to remove excess heat by what is called stack effect.

Figure 2 Typical section showing summer conditions



- **Day lighting.** With the high levels of solar radiation and relatively clear sky in Botswana, it is possible to design the building in such way that during the day it will obtain very high levels of light inside the building without relying on electrical lighting. High-level windows produce good diffused light reflected from the ceiling. Tall narrow windows adjacent to corners reflect light off sidewalls and are more effective than large centrally placed windows.

6. Thermal performance of typical roofs and walls

Tables 3 and 4 contain data for thermal resistances of sections of roofs and walls likely to be found in Botswana. It can be seen that thatch roof has high resistivity and therefore provides cooling in traditional housing. In modern housing, the best form of roof construction would be to have 100 mm fibreglass insulation, detail No. 5 (Table 3). For walls, recommended detail with highest resistivity is No. 4 (Table 4).

Table 3 Thermal resistance of roofs detail, commonly used in Botswana

No	Roof	Thermal resistance R [$m^2\,^0C/W$]
1	250 m thatch	4.5
2	Galvanized corrugated sheets	0.19
3	Galvanized corrugated sheets 10 mm ceiling	0.53
4	Galvanized corrugated sheets 50 mm fibreglass 10 mm ceiling	2.03
5	Galvanized corrugated sheets 100 mm fibreglass 10 mm ceiling	3.42

7. Effect of high temperatures and solar radiation on the strength development of concrete

To evaluate the effect of environmental conditions on the strength properties of concrete a series of tests were performed. The development of compressive strength of concrete, cured in the different conditions (water, moist air, laboratory air, open air – on the sun unprotected and using curing membrane, oven with constant temperatures 20^0C, 30^0C, 40^0C, 50^0C, and 60^0C) was assessed.

Table 4 Thermal resistance of walls detail, commonly used in Botswana

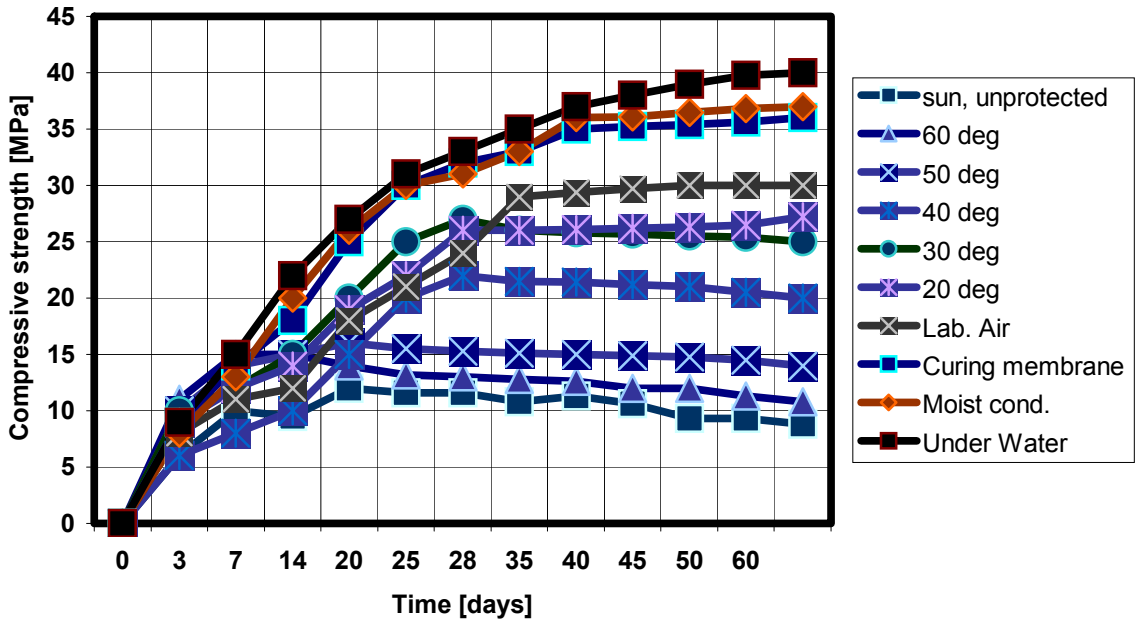
No	Wall	Thermal resistance R [$m^2\,^0$C/W]	No	Wall	Thermal resistance R[m^2 C/W]
1	Outside surface 15 mm cement plaster, 150 mm hollow block, 15 mm cement plaster Inside surface	0.41	3	Outside surface 15 mm cement plaster 115 mm brick 115 mm air space 115 mm brick 15 mm cement plaster Inside surface	0.57
2	Outside surface 15 mm cement plaster 230 mm hollow block 15 mm cement plaster Inside surface	0.51	4	Outside surface 15 mm cement plaster 115 mm hollow block 115 mm air space 115 mm hollow block 15 mm cement plaster Inside surface	0.62

It can be seen from Fig. 3 that water curing gives the best results. Curing on the sun, unprotected, shows decrease in strength of concrete due to development of dry shrinkage cracks. Using protection from the sun (curing membrane or other means of protection) improves the performance of concrete substantially.

8. Conclusion

As Botswana is a country with very high solar radiation, special attention should be paid to planning, orientation, and design of buildings as well as to selection of proper building materials and proper curing of concrete.

Figure 3 Development of strength of concrete in different environmental conditions



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Vera Vokolkova*

Road Transport and its Contribution to Global Warming with Special Regard to Developing Countries

Abstract: Globally, there is concern about road transport because it contributes to the enhanced greenhouse effect in the form of carbon dioxide emissions. Currently, only about 8% of the world's population own a car, but in the absence of concerted action there seems no reason to believe that the developing countries will not eventually have a pattern of ownership and usage similar to that in developed world. However, the general public is no longer prepared to tolerate the environmental degradation associated with road transport. The bad habit of treating the global atmosphere as a free waste repository has effectively ended.

Rapid population and economic growth, with accompanying shortages or under-investment in physical transport capacity and infrastructure, generally have characterized developing countries. The result is a transport system that faces congestions and environmental externalities in some part, while other parts remain under-utilized or underdeveloped.

The paper discusses the principal needs and patterns of SADCC countries in terms of expansion of transport services, networks and their capacity.

The developing countries cannot follow the same pattern of growth as that taken by the developed world because of physical constraints of the planet and its climate. Further transport development is inescapable, but it must be done in a way that meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable development demands that every generation should leave behind good environmental quality and not a negative environmental legacy. As concern for the global environment becomes a pressing need for all of humankind, so must the assumptions on which such trends are based be challenged.

Key words: climate change, Southern Africa Development Community (SADC) countries, road transport, environmental degradation, sustainable development.

1. Introduction

1.1 What is Climate Change?

Climate change as a result of human activities is believed to be one of the most serious problems facing the environment. A changing climate is natural and expected, but there is a well – founded concern that unprecedented human industrial and development activities of the past two centuries have caused changes over and above natural variation.

* Vera Vokolkova, Ph.D., Senior Lecturer, Civil Engineering Department, University of Botswana, Botswana, e-mail: vokolkav@mopipi.ub.bw

Human activities over the last 200 years, particularly the burning of fossil fuels (oil, coal and natural gas) and clearing of forests, have increased the concentration of greenhouse gases in the atmosphere. It follows logically that this is likely to lead to more solar radiation being trapped, thus warming the earth. This is referred to as the enhanced greenhouse effect. There are strong indications, in the form of data from weather stations as well as from indicators such as melting glaciers and rising sea levels, that the earth has warmed up, on average, over the past century. Other factors, such as natural variations in the sun's energy, may contribute to the warming, but the balance of the evidence suggests that human activities are the main cause.

Climate change is a global problem because it will affect not only the countries with high greenhouse gas emissions, but all countries. In the long term, some of these changes may be to the disadvantage of the people of Southern Africa and the plants and animals which occur here, while others may be to their advantage. In the process of going rapidly from one climate to another, many regions of the world, including Southern Africa, could suffer from an accelerated rate of natural disasters such as floods, droughts, food shortages and disease epidemics for which they are poorly prepared. In view of the risks involved in altering the global ecosystem so extensively and the uncertainties of the future, the global community has agreed to try to keep the rate and amount of human-caused climate change within safe limits, while not halting human development. Furthermore, no country acting on its own would be able to substantially influence the effects and causes of climate change. Policies addressing climate change will have environmental, political, economic and social impacts on all of us, and will require action by all of us.

Recognising this, the international community agreed to address the problem of climate change in a global way by drafting the United Nations Framework Convention on Climate Change and subsequent protocols such as the Kyoto Protocol.

1.2 Environmental effects of transport

Transport requires energy. Petroleum thus accounts for 99 % of all energy used by the transport sector. However, these figures refer only to vehicle operation, to what might be called direct energy consumption. For every vehicle produced, energy is consumed in making steel, glass, rubber and other components, whilst for every kilometre driven, more energy is required for infrastructure in the form of bitumen, stone, concrete and so on. Moreover, producing the energy itself is an energy – intensive process. So important are these ' indirect' forms of energy consumption that they make up a further 50% of road transport energy use over and above that for direct vehicle operation. More transport produces greater energy consumption, both directly in the operation of vehicles themselves (66%) and indirectly in provision for them (34%) and each of these sectors produces pollution. [8] There is a significant difference between various modes in fuel efficiencies as well as in carbon dioxide emissions. If we express the polluting characteristics of each mode in terms of some measure of work done- such as passenger- or tonne-kilometre- it becomes clear that road- based transport is by far the most damaging land-based mode. For every kilometre travelled by every passenger, cars not only consume double the amount of en-

ergy but they also produce more than twice as much in the form of VOCs, many of which are carcinogenic and thus unsafe at any level. Similarly, road freight transport is far more polluting per tonne-kilometre than rail or water-based freight transport, whilst air transport is energy-intensive and highly polluting.

1.3 The main greenhouse gases and their sources

Carbon dioxide is the most important of the gases precipitated by humans, responsible for about half of the calculated increase in absorbed solar radiation of the past century. Carbon dioxide is emitted when oil, coal or natural gas are burned, when some industrial materials like cement is manufactured, and when natural vegetation is cut down and soil is ploughed in order to grow crops. The atmosphere contained 270 parts per million (PPM or ml/m3) carbon dioxide before 1750, the beginning of the Industrial Revolution. The atmospheric concentration has been increased at a rate of about 1.5ppm (0.4%) per year over the period for which it has been accurately measured, and is now 360ppm. [1] The commitment to reduction envisaged in the Kyoto Protocol is not considered sufficient to result in significant reduction of the greenhouse gases. It is likely that carbon dioxide will continue to rise in the short term.

Tropospheric ozone is a powerful greenhouse gas, which is formed by chemical reactions between nitrogen oxides (NO and NO2), carbon monoxide and hydrocarbons, all emitted by vehicles and the burning of coal.

2. Southern African Development Community (SADC) Region Characteristics

The fourteen countries of SADC, namely Angola, Botswana, Democratic republic of Congo (DRC), Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe collectively have a land area of about 10 million square kilometres, a population of nearly 200 million people and a Gross Domestic Product (GDP) of 190 billion US dollars. At a US$ 964 average per capita GDP, this is higher than the average GDP per capita for Africa, which is estimated at US$690 (African Development report 2000 – ADB).[5]

The SADC region and sub – Saharan Africa face various environmental problems, including pollution of water supplies, deforestation, desertification, pollution associated with oil and gas development, and a dramatic decline in biodiversity throughout the region.

Many of SADC countries have problems such as devastating impacts of floods and droughts. Soil degradation and shortage of water fuelled by increasing population pressures have created thousands of environmental refugees. Fresh water is scarce and very unevenly distributed in many parts of the sub-region. In fact the degradation of water quality through various anthropogenic actions is probably an even bigger issue than quantity, and it is a problem of most southern African countries both in the humid tropics and arid zones. Because water is such a crucial issue worldwide, the Director- General and the Executive Board have selected water resources and their associated ecosystems as the principal priority for the UNESCO science programme in 2002-2003. [5]

Southern Africa is a net energy exporter. In 1999, the SADC countries collectively consumed 1.3% of total world consumption and produced 2.0% of total world production. Also in 1999, SADC members generated 112.8 million metric tons of carbon emissions (1.8% of the world total). In 1999, the region's dominant economy, South Africa, accounted for 85.4% of SADC energy consumption, 72.8% of SADC energy production and 88.1% of SADC carbon emissions. [5]

SADC commercial energy resources are diverse, and significant reserves of coal, petroleum, and natural gas can be found in the region. Electricity in the region is generated through thermal or hydroelectric resources (with one nuclear facility in South Africa). Natural gas is becoming more significant to the SADC energy sector as large fields off Mozambique, South Africa and Namibia are developed. Angola continues to attract oil sector investment and to increase oil production.

Due to the region's relatively small urban population, access to commercial energy sources is limited. The majority of the SADC population still relies on the use of bio fuel (wood) as its primary source of energy. The countries with the highest rates of bio fuel consumption are Tanzania, Mozambique, Zimbabwe, Zambia and Malawi. Currently, 22% of Botswana's population have access to electricity, surpassing the SADC average, which is at most 20%. Only 4% of Malawi's population - the lowest percentage of any SADC member- has access to electricity. [5] In order to speed up their rural electrification programme, SADC countries are developing a programme of electrification by solar energy.

3. Southern Africa Road Transport

Road transport is the most pervasive of all economic activities in Southern Africa where it carries approximately 80% of the total trade in goods and services. It also accounts for about 20% of formal cross-boarder trade and provides the only form of access to most rural communities. [3] Thus, the provision of a safe, cost-effective and well-maintained road network is a pre-requisite, although not a guarantee, of economic growth and development in the countries of Southern Africa.

In the SADC region, traffic operations tend to be complex and often involve a mixture of motor vehicles, bicycles, animal – drawn vehicles and pedestrians. Relatively old, over-loaded and slow-moving vehicles dominate a large proportion of the traffic composition. The needs of road users are significantly different from those in developed countries.

Road transport services are generally responsive to market demand and are almost wholly liberalised at national level in all SADC countries. Road accidents constitute a serious problem. Cross-boarder movements, particularly of large goods vehicles, are still hampered by long delays at some of the region's posts. Boarder post facilities in terms of parking, communications, accommodation (both office and rest) as well as sanitation are grossly lacking at most SADC international boarders. Almost all do not have even basic workshop facilities to cater for minor breakdowns.

In terms of operations, the issue of cross-boarder permits still needs to be streamlined throughout the region. There are still vast differences across countries in terms of duration of permits, types of permits issued and the charges for such permits. However, even in such areas, there is some progress. For example, agreement has been reached on a regionally harmonised SADC Driver's license, which a number of countries in the region have already started issuing.[5]

At the national level, road transport services are more-or-less adequate in the region, as there are generally large numbers of small and medium-sized operators competing to serve domestic transport demand.

3.1 Road Infrastructure

The SADC road network is one of the region's biggest assets with current replacement costs estimated at US$ 50 billion. In terms of the magnitude of such assets, roads are far more important than either railways or airlines. They are an engine of growth and the key to unleashing the potential for increased production and incomes.

The SADC regional network, excluding that of the Democratic Republic of Congo and the Seychelles, comprises over 930 000 km of roads. The paved main road network has been growing at about 3% per annum since 1980 and now totals just over 105 000 km. More than half of the region's network (511 000km) is in South Africa. [3]

Table 1: Source:[3] Report by STEP consultants to SATCC; Updates from member states

Main Roads		Rural	Total Road	Regional Trunk
Paved (km)	Unpaved (km)	Roads (km)	Network (km)	Roads (km)
105 122	395 900	431 185	931 685	47 583

Whereas the arterial roads are generally in satisfactory condition in the southern tier of the region (South Africa, Botswana, Lesotho, Swaziland, Namibia, Zimbabwe), the roads of Mozambique and the northern tier of SADC nations (Zambia, Malawi, Tanzania, DRC) require major rehabilitation and upgrading. At present, it is not possible to forecast when Angola's arterial road network can be brought generally

to a maintainable state. [5] The secondary and tertiary roads throughout the region require improvement and the assurance of adequate and timely maintenance. There is a widespread problem of heavy goods vehicle overloading, which increases the difficulty of keeping the road network in satisfactory condition.

It is generally accepted that improvement of road infrastructure is one of the key elements in the development process. However, awareness is also increasing about the potential environmental damage caused by the indiscriminate extraction of road building materials. In a number of countries, deposits of good quality gravels are being depleted rapidly and these activities result in an increasing number of borrow pits being opened in the search for better gravels. Furthermore, as the quality of available gravel decreases, more frequent re-gravelling operations are required thereby making the situation even worse. [4] There is concern that these factors are not adequately represented in current appraisal procedures and that improved quantification of environmental factors is required.

3.2 Road Network Characteristics

Excluding the island states of Mauritius and the Seychelles, the percentage of the main road network that is paved is generally less than 40% (range 12 – 39%). Traffic volumes on most of the main regional roads are low, rarely exceeding 2 000 vehicles per day (vpd) except near urban areas, and are generally less than 1 000 vehicles per day. The major exception is South Africa where up to 120 000 vpd are found on dual carriageways near the metropolitan areas, and of the order of 60 000 to 80 000 vpd between major cities.

About 50% of the paved main roads network in the SADC region is in good condition, with the reminder classified as only fair or poor. The unpaved main road network is considerably worse than the paved road network with less than 40% in good condition.

3.3 The main issues of concern

Pollution, much of it transport-related, is at extremely high levels and is growing worse. Transport-related carbon dioxide emissions are growing rapidly and will surpass transportation-related carbon dioxide emissions in the developed world in little more than a decade if present trends continue.

Rising incomes, increasing motorisation, congestion, and the growth of cities outwards into suburbs are clearly emerging. Motorization is occurring so quickly in some of the SADC cities (i.e. in Gaborone, Botswana) that not only is it overwhelming the operational sustainability of those cities' infrastructure systems; it is also causing social, economic, and environmental imbalances and inequities. Building infrastructure is a lengthy and expensive process, one that can rarely keep pace with rapid motorization, so short-term imbalances and high congestion levels often occur as well as motorization's other negative impacts, like accidents and air pollution. In 1998, Harare reportedly concentrated 45% of Zimbabwe's vehicles, a share that had climbed from 37% in 1994 [2].

Cities suffer the most severe environmental impacts from motorization because of added congestion and because the motor vehicles tend to be in poorer condition than those in developed countries. There is a tendency to keep already aging vehicles on the road much longer, and environmental regulations governing emissions are poorly implemented.

The cities have a large proportion of their population below the poverty line. Although automobiles improve the mobility of their few, wealthy owners, they increase congestion and delays for many who cannot afford them. Automobiles are a particularly heavy burden on those whose travel is limited to slow-moving public transport vehicles, which cannot escape congestions of major routes. Public transport and non-motorized transport, principally walking and bicycles, remain the principal means of mobility for most citizens.

In Southern Africa, formal bus service is provided using different combinations of public and private operations. For example, in Botswana and Kenya it is privatised and 25- and 16- seater minibuses dominate. Similar cases of Para transit dominance appear in Harare, Zimbabwe, [2] and in South African cities. In metropolitan Johannesburg, for example, 35000 kombis – nearly 60% of which operate illegally- account for over 50% of all public transport trips, causing a decline in the bus services provided by government and private operators [10].

3.4 Improvements in the Existing System

SADC governments have recognised at the highest levels that the current unfavourable state of infrastructure in the region requires radical transformation. The basis of reforms in the region in the transport sector is the SADC Protocol on Transport, Communication and Meteorology, which came into force in July 1998.

Development Corridors and Spatial Development Initiatives are a new concept that is taking root in the region. From the regional integration point of view, a major achievement is that the southern African countries have designated a regional Trunk Road network (RTRN) system with corresponding common design standards and specifications and common road signs. Although the RTRN varies in state and condition from country to country, generally, it is in fair condition.

The Southern African Transport Corridors have developed over a long period of time and today provide the backbone for intra-regional and international trade between and for the SADC countries. These corridors carry the bulk of long distance traffic within SADC and represent essential transport axes for export and import trade both within SADC and between SADC and the rest of the world including the rest of Africa. [5]

South Africa, in terms of its Convention commitments, has undertaken an inventory of all its emissions of greenhouse gases. The results show that in 1990, South Africa was in the top twenty emitting countries in the world, responsible for just over 1% of global emissions. The emission rate per person in South Africa (10.1 tons of carbon dioxide equivalent per person per year) is above the global average (about 7 tons per person per year), but considerably below that of countries such as the United States of America (over 20 tons per person per year). [1]

The main reason for South Africa being a relatively large greenhouse gas emitter is that it is very well endowed with coal, but has little oil or natural gas, and a limited potential for hydroelectric power. Currently coal provides more than 80% of the country's primary energy needs. [1]

The transport sector (cars, trucks, buses, trains and domestic airlines) accounts for about a tenth of South Africa's greenhouse gas emissions. The large distances and high altitudes in South Africa, combined with large distances between workers' homes and their separate places of work resulting from apartheid planning, contribute to higher transport sector emissions in South Africa, while the relatively good road and rail network help to keep them down. Since transport costs are a large part of the cost of production and cost of living in South Africa, and transport is the main source of noxious pollutants such as hydrocarbons, carbon monoxide and nitric oxide, there are good reasons other than climate change to increase energy-efficiency and reduce the emissions of the transport sector.

The options for reducing emissions while maintaining the same level of service include the development and wider use of improved public transport systems; increased use of rail rather than road or air for inter-city cargo transport, and measures to improve the efficiency of vehicles. In the longer term, better spatial development and road planning will help to reduce commuting distance and prevent energy-wasting traffic jams.

There are many characteristics that the cities in SADC countries share to some degree, which profoundly influence transportation patterns and system performance:

1. A historical concentration of trip attractions in the city centre
2. Generally higher densities than cities in industrialised countries
3. Socio-economic segregation, forcing long trips for the poor, who are usually isolated on the urban fringe

The challenge for policy makers is to integrate automobiles, public transport vehicles that range from small minivans to large buses, and non – motorized transport, in a manner that decreases congestion and increases mobility while minimizing other costs to the external environment.

4. Way Forward

4.1 Research and monitoring

Science has played a pivotal role in bringing the issue of climate change to world attention, and will continue to be crucial in the search for solutions. South Africa has an important contribution to make there, as one of the few developing countries with a strong research sector.

South Africa maintains a Global Atmosphere Watch monitoring station at Cape Point, where the changing composition of the atmosphere is measured with great precision. This is a vital station in the global network due to its location. The network of climate monitoring stations in South Africa is the best in Africa. [1]

4.2 Information Collection System

By establishing such a system, SADC governments will ensure that the methodology for collecting the information and databases used by different countries will be consistent and standardised to ensure that the data can be easily collated and consolidated. This will also lead to reducing the cost of meeting Convention commitments in the future.

4.3 International and Regional Relationships

The atmosphere mixes across national boundaries. Since it is always cheaper to reduce emissions in some countries than others, it is possible to get the greatest global reductions at the lowest global price by allowing a country which has committed itself to reducing emissions to do so by helping to reduce emissions in another country, usually by paying them to do so or by providing them with the necessary technology on favourable terms.

4.4 The Kyoto Protocol introduces a policy of joint implementation (JI).

Joint implementation is an agreement between two nations in which they undertake an activity together to reduce greenhouse gas emissions, or increase a greenhouse gas sink. Typically, one is a developed nation listed in Annex I of the Convention, and the other is a developing country. The developed country pays for the developing country to take an action, which reduces net emissions, and claims all or part of the credit in its own greenhouse gas inventory.

However, there is a concern in developing countries that selling the cheapest mitigation options now will leave the next generation with only expensive options when they need to achieve mitigation themselves. [1]

5. Conclusions

South African scientists are currently undertaking studies to estimate the possible effects of climate change on the country. All the climate models predict that the mean air temperature over South Africa will increase in the future, but they disagree about precisely how much. The estimates fall in the range of 1° to 3.5° C over the next century, with a most likely estimate around 2° C. The increase will be greater at night than during the day, and greater in winter than in summer. It is highly unlikely that the average rainfall will change, but it could either increase or decrease, by up to one-fifth of its present average value. It could increase in some parts of the country, and decrease in other parts. There is an indication, that areas in the interior of continents (such as the South African Highveld and Kalahari Basin) may become drier. [1]

The policy responses should include support for monitoring of climate change in the whole Southern African Region and the factors that cause and respond to it, and for research aimed at anticipating ecological changes, predicting their location and developing adaptive strategies. Science and technology policies should ensure that Southern Africa has good access to international research and development in this field. The Southern African position in Convention negotiations must balance the desire not to damage the Southern African economy or rate of development with the need to keep the global and local environment tolerable for all living things, within the countries' overall environmental policy, which has sustainable development as

the overall goal. Transport policy should promote public transport and the paving of urban roads (thus simultaneously reducing dust, maintenance and gas emissions).

The draft resolution was initiated and presented by Botswana with the support of all southern African countries to the UNESCO General Conference last year, seeking support for a project on Sustainable integrated management and development of arid and semi-arid regions of Southern Africa. [9] Its main theme is Sustainable Development, generally defined as " development which meets the needs of present generations without compromising the ability of future generations to satisfy their needs". The sub-programme intends to conduct multi-disciplinary studies of arid and semiarid areas of southern Africa and integrate results into a coherent regional master programme of sustainable development and social transformation of countries in the subcontinent, with major emphasis placed on sustainable management and development of the environment using a harmonious combination of natural and social sciences, culture, education and communication. This sub-programme is bringing together 14 southern African countries with the hope to break through the barriers of political and socio-economic differences. Sustainable development is more than just economic growth because there is no sustainability without sharing, without justice and without freedom of expression. No country in the region or indeed the whole of Africa can go alone and succeed. No country has sufficient human and capital resources to promote the development in its respective country. There is not a sufficient pool of scientists to engage in research that may lead to the development of African countries. It is only if the countries pool resources that meaningful contributions may be made to the subregion. Development of databases in this field is critical.[9]

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Dana Wenscheova*

Transportation and Environment in the City of Brno

1. Introduction

Brno is located in Central Europe on the rim of the Moravian Gate through which a road connecting the northern and southern parts has been passing through for centuries. Its 400,000 inhabitants make it the second largest city in the Czech Republic as well as one of the most important industrial centres in the country. Within the region, Brno plays a very important role. Throughout its history, it has been the natural administrative centre of South Moravia. There is no doubt that the city will remain the natural centre of the South Moravian region in the future.

After 1989, there was an inevitable rapid increase in personal car transportation that always accompanies a dramatic development of entrepreneurship and an increase in the standard of living for the inhabitants of Brno. Cars offer a higher degree of mobility and, in certain circumstances, very high accessibility with respect to time and distances. In cities, however, an increase in the number of cars can result in problems that offset the advantages of cars from the point of view of quality of life. One of the problems is an increasing demand for space required for roads and parking lots at the expense of other uses, i.e. limited space for pedestrians in city centres, parking lots taking up space for green surfaces and playgrounds in residential areas, and other limited means of transportation. Last but not least, pollution of the environment with fumes and noise has to be mentioned.

While the use of a car reflects a freedom of choice for every citizen, the city inhabitants expect negative impacts brought about by cars to be resolved by someone else. In a representative sociological research conducted in Brno in 1997 within the framework of 'Brno – The Healthy City Program,' city inhabitants indicated that transportation represents one of the biggest threats for the environment. In particular, they mentioned noise, smog and the number of cars. At the same time, they were dissatisfied with the quality of the city public transportation.

2. Development of Motorization and Car Transportation

Brno is considered to be a medium-size city with none of those features which would apply to a large city. A comparison of the number of cars per 1,000 inhabitants in Brno and other cities or regions in the EU shows, however, that the increase of the number of cars has been much more dramatic in the past few years in Brno than in other cities and regions which have been developing and expanding at a slower rate. From the point of view of car transportation, Brno is on par with most other European Union countries. The transportation infrastructure, however, is not ready for this. There is less time available to take the necessary steps in Brno than in countries where the development of car transportation has been continuous. It is not only the

* Dana Wenscheova*, PhD, City Conception Division, Brno

increase in the number of cars but also the extent to which they are used that represent a problem.

Unfortunately, taking the gross domestic product (GDP) as an indicator of the economic success assumes that mobility is a contribution to the economy even though it causes significant problems which in turn causes further expenses and makes additional investment necessary. At the same time, the share of the city public transportation keeps on declining.

In 1995, the Environment Department of the City Council implemented a new system that monitors quality of air. This system complements the monitoring of the Public Health and Hydrometeorology Institute. Comparison of the results shows that car transportation is becoming a major source of air pollution. Excessive noise produced by transportation represents another serious problem. According to tests carried out by the Public Health Office of the City of Brno, the permitted level of 65 decibels is being exceeded in most of the monitoring spots located within proximity of busy roads. In addition to car transportation, public transportation and, in particular, streetcars contribute to the excessive noise. Interestingly enough, the levels of noise remain approximately the same in spite of the increasing number of cars. This phenomenon is related to the improvement of rolling stock and reduction of the proportion of heavy freight transportation for supply and delivery.

3. Solution – The Role of the Municipality

The municipality is responsible for the development of the City and its environment. Should the municipality and, in particular, the political representatives fail to realize the impacts of the rapid increase of car transportation and to take precautionary measures, it would result in means of transportation slowly starting to diminish and impair its surroundings.

In spite of the loopholes that, for example, do not allow cities to impose taxes, the municipality has tools to solve the problems. Urban planning, an opportunity to collect parking fees, and charge for entering designated city zones are some of these tools.

Transportation has been a key issue in urban planning in Brno since the 1950s. After 1989, the City began preparing a new master zoning plan that was to reflect new requirements and enable a harmonic development of the City in all areas. Through agendas of political parties, the master zoning plan was based on the following issues: respecting the natural surroundings of the city, maintaining a historical residential structure, developing efficient transportation systems, and emphasizing public transportation. The first political document that reflects the will of the municipality to solve the transportation problems was ‘Brno – The Healthy City Program’ of 1993. This program aimed at increasing the quality of the city’s public transportation, making city public transportation more attractive for the public, and emphasizing the advantages for the environment by encouraging pedestrians and bicycles. The program also suggested measures that should decrease the negative effects of transportation on the environment and inhabitants.

In 1994, the master zoning plan which is currently in force was approved of. This was a statement regarding the transportation policy of the city.

The goal was and still is to create conditions for providing the city with an ideal mix of all means of transportation, emphasizing pedestrians and city public transportation, especially in the city centre.

- Bicycle transportation and pedestrians

  The goal is to create conditions necessary for safe and convenient movement of bicycles and pedestrians within the whole city .

  - areas with a high number of pedestrians in which other means of transportation should be significantly limited were designated
  - a complete network of bicycle roads was drawn up.

- The city public transportation

  The goal is to maintain the highest share of the city public transportation possible

  - an increase of the rail network by 22 % and upgrading of streetcars on segregated tracks were suggested
  - a fast subway going north to south was also suggested

- Integrated and combined transportation
  - creates conditions for connecting the city and regional transportation systems.

- Railroads

  The goal is to upgrade and reconstruct the railroad hub that would allow for the future connection of high speed trains (HST)

  - A new passenger railroad station in a different location, including a shed station, was suggested
  - HST corridors were designated
  - Container transhipment centres were designated
  - Development of railway sidings to secure railway accessibility of industrial and production development sites was suggested

- Car Transportation
  - The goal is to complete radial ring road networks to such an extent that a regulating of personal car transportation is possible.
  - Air Traffic
  - The master zoning plan assumes that the international public airport in Turany will be rebuilt and developed

In 1997, the City commenced a process of long-term strategic planning. By force of its introductory document, the municipality showed its adherence to the sustainable growth principle.

In 1998, the City Council drew up the document ‘Transportation Policies of the City of Brno,’ which states the goals and measures and is related to the master zoning plan that has the same priorities. The protection of the historical city centre from personal car transportation is dealt with in detail in the city centre master zoning plan

of the Historic City Protected Zone. In June 2002, the City Council approved an important document on city development strategy – 'Strategy for Brno'.

Reality lags behind the written documents. The increase in the number of cars and the degree of transportation exceeded the investments the City could make into development of transportation infrastructure. The by-pass route of a fast road in the western part of the City touches a resort area surrounding the Brno Lake and Bystrc - a residential area, which brought about a considerable degree of resistance on the part of a large group of inhabitants and the date of its completion has not been determined yet. A large beltway that is to protect the extended city centre from excessive transportation is expected to be completed in approximately six years. Construction of underground parking lots in the vicinity of the historic city centre, which should eliminate parking on the surface and thus improve the quality of the environment for pedestrian and bicycle transportation, has not been started yet.

The construction of bicycle roads is very slow. The City lacks the financial means necessary for purchasing streetcars and constructing new rail tracks.

4. The Historic City Protected Zone problem – limiting car access in downtown Brno.

There is a city ordinance which regulates traffic congestion in the Historic City Protected Zone. The ordinance divides the city centre into zones with different regulation degrees. In addition, it prevents driving through the Historic City Protected Zone by a system of traffic signs. The problem is that many residents, firms located in the Historic City Protected Zone and other institutions have permits for entering. In total, 7,000 permits have been issued. At present, the situation is getting better and 3,625 permanent and 1,629 short-term permits are issued per year. However, there are only 2,400 parking spaces on the surface. This makes the city centre very crowded during the day and there is even parking on the sidewalks. Delivering goods to the departmental stores represents another problem.

A major improvement could be achieved even without considerable additional investment if the City were prepared to reject the idea that everybody who lives or has a business in the city centre has to have one or more cars parked right in front of his or her house. It takes 10 to 154 minutes to cross the Historic City Protected Zone on foot. Restricting the number of parking spaces could attract investors into building underground parking lots near the city centre. If the hours designated for delivering to the stores were adhered to, the pedestrians would not have to walk in between service cars.

The City co-operates with many non-governmental organizations. Within the framework of the 'Brno – The Healthy City Program', local projects aimed at education and increasing the safety of inhabitants, children and pedestrians in particular, have started. The City actively supports and together with the South Moravian Region has started to work on the solution of regional integrated transportation aimed at supporting and encouraging the use of public transportation. Brno, as one of the few cities located in the countries that have applied for the EU membership, is a member of the Car Free Cities Group. The City is preparing a

closing –off of the city centre to prevent a large number of cars from entering and to limit the supply and delivery to the stores to certain hours.

The City of Brno has proved its support to environmentally friendly means of transportation with its interest in railroad transportation. Its participation in the Eurocities Project shows its commitment to high speed train routes. The City, in co-operation with the South Moravian Region, Ministry of Transportation and Czech Railways Company is drawing up plans for a reconstruction of the railroad hub including a new passenger railroad station that will open the area for the planned development of the City of Brno southwards and will offer the railroad transportation a capacity railroad station and other infrastructure on par with the 21st century.

Antonin Kremr*

The Modrice Project – Reconstruction and Intensification of the City Waste Water Treatment Plant in Brno

The quality of surface water of the South Moravian Region is the cynosure not only of water managers but also of environment protection authorities. The main reason for this is the fact that the present negative impacts can be felt even at the borders between the Czech Republic, Slovakia and Austria. The Statutory City of Brno, the second largest city in the Czech Republic and the centre of the region, ranks among dominant polluters of the Svratka river and the whole lower river flow south of Brno. The present state is caused by the relatively low wateriness of the rivers combined with a very the high percentage of the population connected to public sewerage and the capacity of the present city waste water treatment plant. The prevailing problem of water quality results from the high amount of nutrients, especially nitrogen and phosphorus compounds. These substances can be transported for long distances and thus cause eutrophication of the water flow with crossborder effects.

A number of national as well as international studies have dealt with the quality of water in the rivers flowing into the Danube including detailed monitoring of their quality. Several years ago a multi-criteria evaluation of priorities was worked out as part of the National Action Plan for the Morava River Basin which was prepared within the framework of the Strategy Action Plan of Environmental Programmes for the Danube River Basin. All these works have shown that Brno and the adjacent region belong to the particularly problematic areas of the Danube Basin.

As for drainage, the City of Brno, compared to other large cities of the Czech Republic, has an essential disadvantage – a low amount of wateriness of the passing rivers of Svratka and Svitava. The spine of the sewer network is formed by six trunk sewers of which four lead to the Modrice WWTP along the Svratka river and two along the Svitava river. From today´s point of view, the waste water treatment plant in Modrice is a standard mechanical-biological treatment plant with activated sludge tanks for organic carbon degradation. The plant´s operation was launched in 1960 when it represented the contemporary level of knowledge and technology in treatment. It was the first construction of this type implemented in former Czechoslovakia. The construction used the then progressive methods, technologies and procedures. Construction of the whole complex of the central sewerage treatment plant took ten years.

Water treatment is carried out by means of a gradual removal of rough and then fine suspended substances, and then the soluble and colloidly dispersed substances are removed with biological treatment. The equipment itself was very modern at that time and we can say that it ranked among the most advanced equipment in Europe.

* Kremr, Antonin: Statutory City of Brno, Czech Republic.

The biggest weakness of the present WWTP is its biological capacity. The substantial and hydraulic burden of the plant has been increased with the gradual extension of the sewer system. In the first phase, the passage was increased up to 1989. At the beginning of the nineties there was a gradual reduction not only of the passage amount, but also of the total pollution to almost half values. At present, the WWTP capacity is limited with the flow capacity of biological grade which is 1.8 m3/s, dry-weather inflows with peaks to 1.83m3/s, and higher levels are managed by the WWTP with no problems.

Another weakness is the treatment process itself as the WWTP technology is not equipped for the removal of nutrients in a biological way. However, WWTP had already started to deal with phosphorus removal in 1996 when there was semi-operational experiment with verification of the amount of doses gained from laboratory measures and search for optimum dose place. In mid 1997, experimental simultaneous precipitation with ferric sulphate was started. Moreover, the positive effect of phosphorus elimination showed with improved settling properties of the biological sludge and consequent reduction of draining parameters BSK 5, CHSK and NL. For example,,, in 1999 Ptot at the drain of 0.38 mg/l was reached, in 2000 the annual average value was 0.43 mg/l. Chemical precipitation of phosphorus proved to be effective, yet expensive.

Although a number of both investing and operational measures has been made at the Brno treatment plant, the technological process is not capable of meeting some of the limits required by national and European rules. In the case of the Brno plant, the situation is more urgent as the passage in the Svratka river is almost identical with the amount of water let out from the plant in dry summer months.

This unsatisfactory condition will be corrected only with the total reconstruction of WWTP which was launched last year.

The Modrice project, as one of the largest investments in the City of Brno is called, needs total reconstruction and intensification of the plant in order to reach the outlet limits required not only by Czech rules, but also by the 91/271/EEC Council Resolution of May 21, 1991.

In addition to this basic project objective, total automation of the plant technological processes will be implemented and the construction of the plant will be carried out within the framework of these works. The first drying chain of sewer sludge in the Czech Republic will be built.

The project structure is based on three major agreements where the Brno Water and Sewage Works, j.s.c. (Brnenske vodarny a kanalizace, a.s. – hereafter BVK) acts as investor and debtor to the European Bank for Reconstruction and Development (hereinafter EBRD) and both serve as main shareholders and guarantors likewise:

a) Lease and Operational Agreement for 25 years between the City which owns the infrastructure property and service company BVK which funds the project from its own sources.
b) Loan Agreement between BVK and EBRD providing loan to the amount of EUR 47.5 mi. (more than CZK 1.6 mld.).

c) Agreement on Project Support among EBRD, BVK and both main shareholders of the company.

Apart from these three major agreements, others have been concluded securing the return of borrowed means to the Bank in the event that BVK is not able to repay the loan. These are mostly pledge agreements on the property of the present and newly reconstructed WWTP. The loan is further secured with other agreements that may be considered standard and commensurate with the amount of given financial means. Also the company shareholders guarantee the bank that, should the increase of the project price exceed a certain agreed limit, they will pay for this increase from their own sources, and also guarantee for the project to be finished in all events.

The project implementation itself has and will have an impact on the price of water in the City of Brno. Thus, the principle of co-participation of present as well as future customers in the funding of water-management investments is confirmed. The general awareness of the bad state and condition of infrastructure might clearly have a negative effect on the social bearing of the population when confronted with such high fees for water consumption. Therefore a study (opinion poll) on the willingness and ability of the population to pay the higher charges levied on water was made within the framework of the preparation works. The poll results show that the population prefers higher requirements for environmental protection and is willing to participate in this trend to a certain degree. One of the ways to reduce significant impacts on the price of water is to use grant funds. The City of Brno managed to gain a grant from the EU Phare fund to the amount of EUR 14,2 mil for the reconstruction of the trunk sewers of the sewerage system. This grant reduced the financial necessity to make investments that would otherwise have to be paid for from the sewerage rate. The trunk sewers reconstruction is taking place at the same time as the successful WWTP reconstruction. The city management was also successful with another application for a grant from the ISPA funds. In this case, as well, the EU decided upon financial participation to the amount of EUR 18.1 mil. out of a total EUR 29 mil. for the reconstruction of the main and street sewers that are in disrepair. This project is in the preparatory phase, but its effect will be seen in the reduction of the amount of ballast waters in sewerage and leakage of sewage waters in the environment.

The total project costs including preparatory work and other contingencies approach EUR 70 mil out of which the price of works according to contract for works is EUR 60 mil. Repayment of the provided loan will start when the works are finished and will last for the following 12 years.

The implementation phase started in May 2001. Reconstruction is done in the form of complex supply at a fixed price. Works are performed by a French-Czech consortium of companies led by the Ondeo-Degremont company that was chosen in international public tender. WWTP should start pilot operation by the end of 2003. Within a one-year pilot operation, the function and effectivity of treatment and level of operational costs under different operational conditions will be examined.

The whole project is a good example of international cooperation. The initial works and studies were worked out with financial and technical assistance from Austria. Companies from Great Britain, the Netherlands and Denmark participated in

other financial and technical analyses of the project feasibility prior to its launch. The main source of funding is a loan from the European Bank for Reconstruction and Development. Technical advice in the preparatory and implementation phases is paid for from a grant by the Danish Government.

The waste water treatment plant is the last article of reduction or elimination of ballast originating in the process of water use. It is also where the ballast which already got in the waste water is removed. However, for a long time the

Brno Water and Sewage Works company have been stressing the prevention and elimination of pollution that gets into the sewerage system. It is mainly through the monitoring of industrial polluters focusing especially on heavy metals that may cause problems for subsequent elimination of treatment sludge. Thorough monitoring is a precondition for better knowledge on relations in sewerage systems which also allows for optimizing the size of facilities as well as the treatment process.

Implementation of this project will give Brno a modern waste water treatment plant corresponding to European standards. Improvement of water cleanness will be welcomed by inhabitants around the lower flow of the Svratka, Dyje, Morava and Danube rivers.

Part 8

Latvian Processes and Methodologies

I. Skards, J. Raipulis, I. Karlsone, V. Strazdiņa*

Why Have Suicide Rates in Baltic States Increased after Restoration of Independence after 1990

Key words: suicide, drown, sudden death, Latvia, Lithuania, Estonia, Soviet Union, males, females

Abstract: An increment of suicide rates has been observed during the period of the year 1990 to 1995 after getting independence from former Soviet Union (that is in the transition period of planned economy to market economy). Nearly all states that became independent have had an increase in suicide rates as a result of segregation of former Soviet Union. Only Muslim countries have had the opposite trend. Latvia and Lithuania are the countries with more pronounced increase in suicide rates. The increase of suicide rates in the female population is a little lower than in male population. In most European countries, which were not coupled with Soviet Union, the suicide levels decreased during this period.

Statistical dates from Latvia show that, infant mortality correlates with the suicide death for males. Both infant mortality and suicide death of males reached a maximum between the years 1992 and 1995 The X coefficient is more than three times higher than the standard error of the coefficient. That means there is a high degree of confidence. If the infant mortality should be five (as in developed European countries), then suicide rate should be eighteen (the suicide rate in Great Britain). The same is true for females. However, the suicide death rate for females is lower and the 11correlation between infant mortality and suicide death is a little lower, than in the case of males.

Other investigations have been carried out by using data for different regions of Latvia. They can be distinguished by regions with higher and lower economic success. In the regions with greater economic success as Dobele, Riga, Ogre, Limbazi, Kuldiga, the suicide level is lower than in regions with lower economic success.

The suicide rate also correlates with the number of registered alcoholics. Alcoholism (both alcohol abuse and dependence on alcohol) is a frequent diagnosis in the case of those who have committed suicide. Specific factors associated with an increase in the risk of suicide among alcoholics is the worsening of the social situation. We can see in the graphs, the registered alcoholic patients and suicide rate for different districts of Latvia.

The suicide rate correlate with the death rate by accidental drowning. The close correlation between suicide death and death by accidental drowning could be because accidental drowning should also be attributed to suicide death.

* Establishment of Higher Education at Rezekne and the University of Latvia, e-mail skards@lanet.lv

The suicide rate correlates with external causes of mortality. If there was no mortality caused by external sources, then the suicide rate should be only 3 /100000 of the population. The correlation is so obvious, that it is not ruled out, that death classified as sudden death partly may be the death by suicide. For comparison data for Czech Republic and Slovakia were analysed. They revealed very low suicide and homicide levels. No turnover shifts at the period from planned to market economy have been observed. That shows a balanced environment, with a change in the structure without social shock.

Introduction

According to WHO estimates approximately one million people are likely to commit suicide in the year 2000. Suicide is among the top causes of death in every country, and one of the three leading causes of death in the 15 to 35-year age group. The burden of suicide can be estimated in terms of DALYs (Disability Adjusted Life Years). According to this indicator, in 1998 suicide was responsible for l1.8% of the total burden of disease worldwide, varying between 2.3% in high-income countries and 1.7% in low-income countries. This is equal to the burden due to wars and homicide, and roughly twice the burden of diabetes, and equal to the burden of birth asphyxia and trauma (Angst J.Angst F, Stossen HN, 1999) (WHO/MNH/MBD, 2003).

There are fairly strong associations between unemployment and suicide rates, but the nature of these associations is complex. The effect of unemployment is probably mediated by factors such as poverty, social deprivation, domestic difficulties, and hopelessness. On the other hand, people with mental disorders are more likely to be unemployed than people in good mental health. At any rate, due consideration should be given to the difference of recent loss of employment and long-term unemployment.

In the majority of countries, more males commit suicide than female. But the male/female ratio varies from country to country. China is the only country in which female suicides are not higher than the number of male suicides in rural areas, and are approximately equal to male suicides in urban areas.

As a serious public health problem suicide demands our attention. In 1999 WHO launched SUPRE (full form?). It is a worldwide initiative for the prevention of suicide (Gunnell D, Frankel S. 1999)

Suicide is important for Baltic States, because the rates are higher than in other European countries. Dr Airi Vārnik, Tartu University, Estonia (Varnik, Airi, 2003) is actively engaged in the WHO International Network for Suicide Prevention.

The aim of the work was to analyse the reasons for the increment of the suicide rate in Latvia after the restoration of independence.

Materials and methods

Material has been put down as X-Y graphs. The years on several graphs have been indicated by last numbers of the year. The Quattro Pro program has made pair were

correlation analysis. Material for Czech Republic and Slovakia has been obtained by HFA (full form?).

Results and discussion

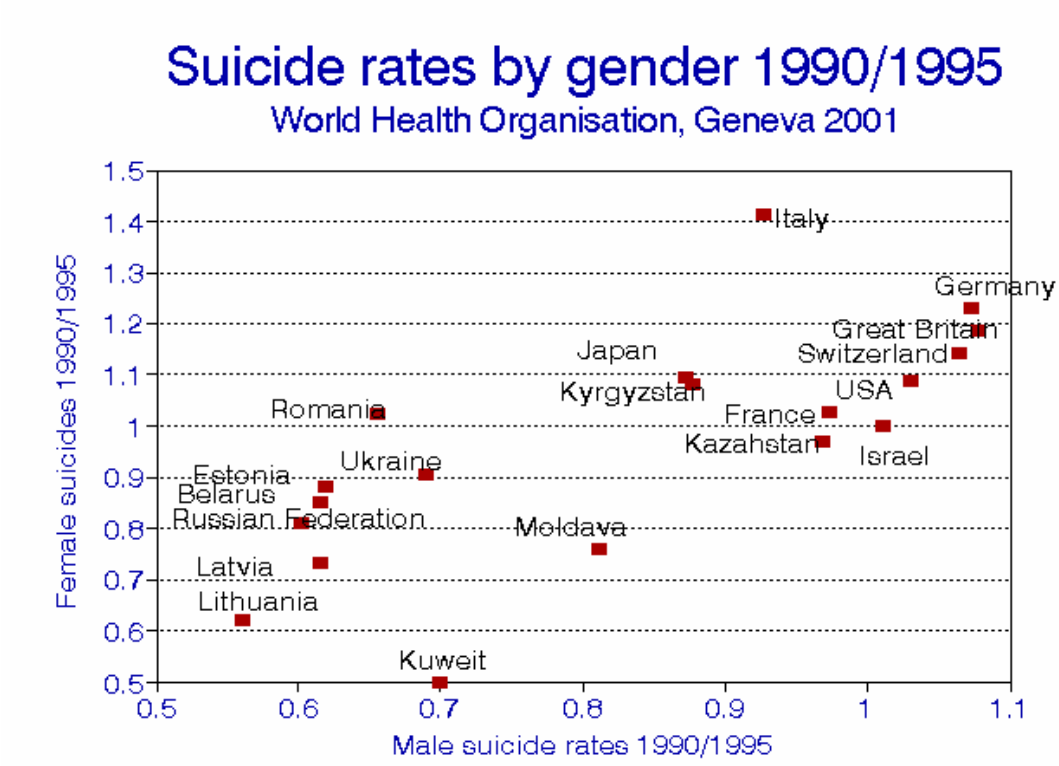


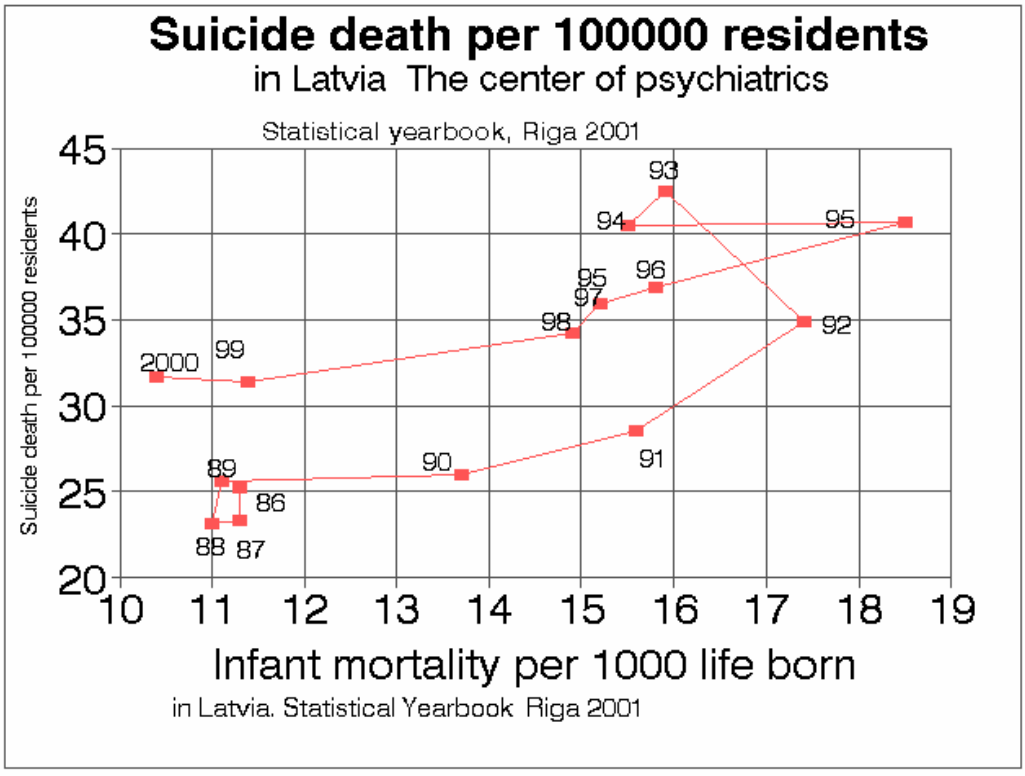
Fig.1.

Regression Output:

Constant	-0.245
Std Error of Y Estimated	0.20
R Squared	0.89
No. of Observations	20
Degrees of Freedom	18
X Coefficient(s)	1.48
Std Error of Coefficent	0.11

Lower X values correspond to lower male suicide ratio before the restoration of independence in 1990 compared to the suicide rate after five years of living in an independent state. If the ratio should be one, then it should correspond to the situation when the suicide rate does not change with time. Lower suicide rates correspond to the situation when the suicide rate in 1995 is higher than in 1990. One can see that the lowest ratio values are in Lithuania. The second from the lowest end are the ratios for Latvia. Estonia corresponds to the states were the increase of suicides after getting independence is less denoted. Belarus is on the same level as Estonia. Romania, Ukraine, Moldavia are on a better level than Estonia. Kazakhstan and Kyrgyzstan are states where minor changes occurred after independence. The suicide level among Muslim residents, in many cases, even decreases after independence (not seen on this graph). They may be so low that the changes during 1990 - 1995 are statistical less significant. Thus is in the case of Kuwait, were the

suicide level is 26 times lower than in Latvia. The suicide rate for Azerbaijan is 16 times less than in Latvia (not shown on this graph). This is characteristic for Muslim states. The values for Israel, Germany, Switzerland, Great Britain and USA are higher than 1. That shows a decrease in mortality during the period 1990- 1995. On Y -axis are the values for females. The values for female suicide rates are lower than for males (not shown on this graph). On this graph is shown the ratio of suicide rate from 1990 to 1995. For female this ratio is a little higher than for males. Presumably females are reaction to the crisis situation after 1990 is less intensive than the males. In countries with high economic development, for example, Germany, Great Britain, Switzerland, the ratio of suicide rate from 1990 to 1995 is higher than one. This is valid for males and females. However for females the values are a little higher than for males. That shows that in these countries a lowering of suicide level has been observed in the period between 1990 and 1995. The lowering of suicide rate for males is more expressed than for females.



x=infant mortality y= suicides for males

Fig.2.

Regression Output:

Constant	9.3
Std Error of Y Estimated	4.6
R Squared	0.493
No. of Observations	13
Degrees of Freedom	11
X Coefficient(s)	1.67
Std Error of Coefficient	0.51

Infant mortality correlates with suicide death for males. The X coefficient is more than three times higher than the standard error of the coefficient. That means a

high degree of confidence. If the infant mortality should be five (as in developed European countries), then the suicide rate should be 18 (the suicide rate in Great Britain). In Latvia, the maximum suicide and infant mortality rate have been observed between the years of 1992-1995.

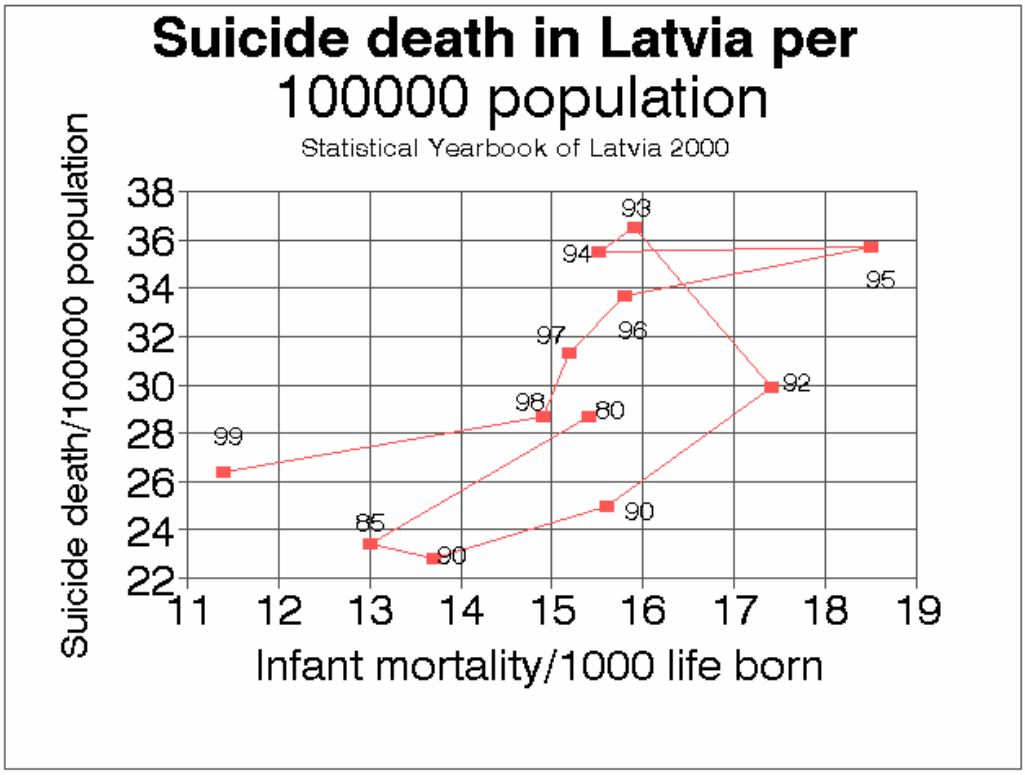


Fig.3.

Regression Output:

Constant	4.49
Std Error of Y Estimatged	3.87
R Squared	0.416
No. of Observations	12
Degrees of Freedom	10
X Coefficient(s)	1.67
Std Error of Coefficient	0.62

Suicides are in parallel with infant mortality. In the year 1995, both values attained the maximum value. This may be the effect of social depression after switching over from planned economy to market economy. In the period of planned economy the minimal infant mortality and suicide death has been observed in 1990. In 1995 both indices were higher than in 1990. The standard of living had also improved during the time of planned economy. After 1995, both indices decreased. Presumably, the social and economic situation is improving. The infant mortality has reached values, which are even lower than they were in the period of planned economy. However suicide rates are still higher than they were at the period of planned economy. By extrapolation of the regression to infant mortality, at five % (common for Scandinavian countries) the suicide rate is only 12.8 per 100,000 populations. The standard error of the X coefficient to the estimated regression is 2.7 times smaller than the coefficient itself. Regression has a high degree of confidence.

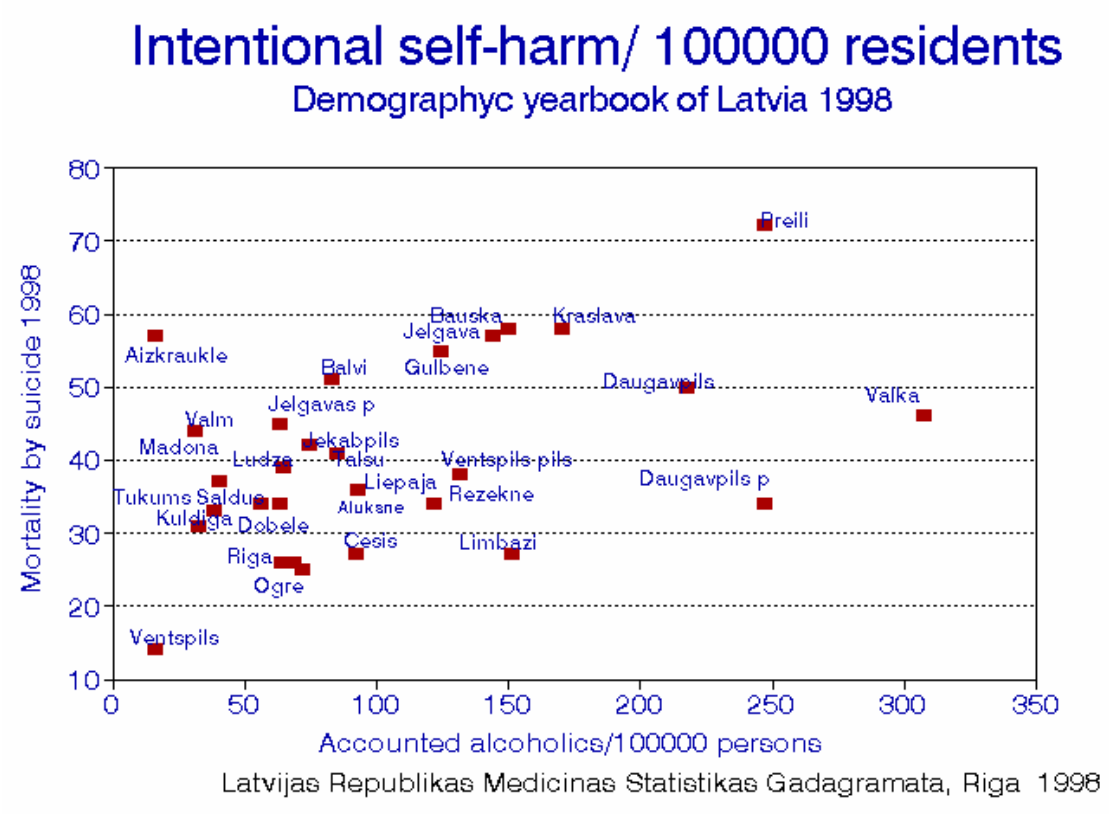


Fig.4 . X= registered alcoholics Y= suicides

Regression Output:

Constant	31.93
Std Error of Y Estimated	11.71
R Squared	0.195
No. of Observations	30
Degrees of Freedom	28
X Coefficient(s)	0.0777
Std Error of Coefficient	0.0298

The suicide rates correlates with the number of registered alcoholics. Alcoholism (both alcohol abuse and dependence on alcohol) is a frequent diagnosis in those who have committed suicide. However, there is no biological, psychological or social explanation for the correlation between suicide and alcoholism. A specific factor associated with increase risk of suicide among alcoholics is the worsening of the social situation. The graphs show the registered alcoholic patients and suicide rates for different districts of Latvia.

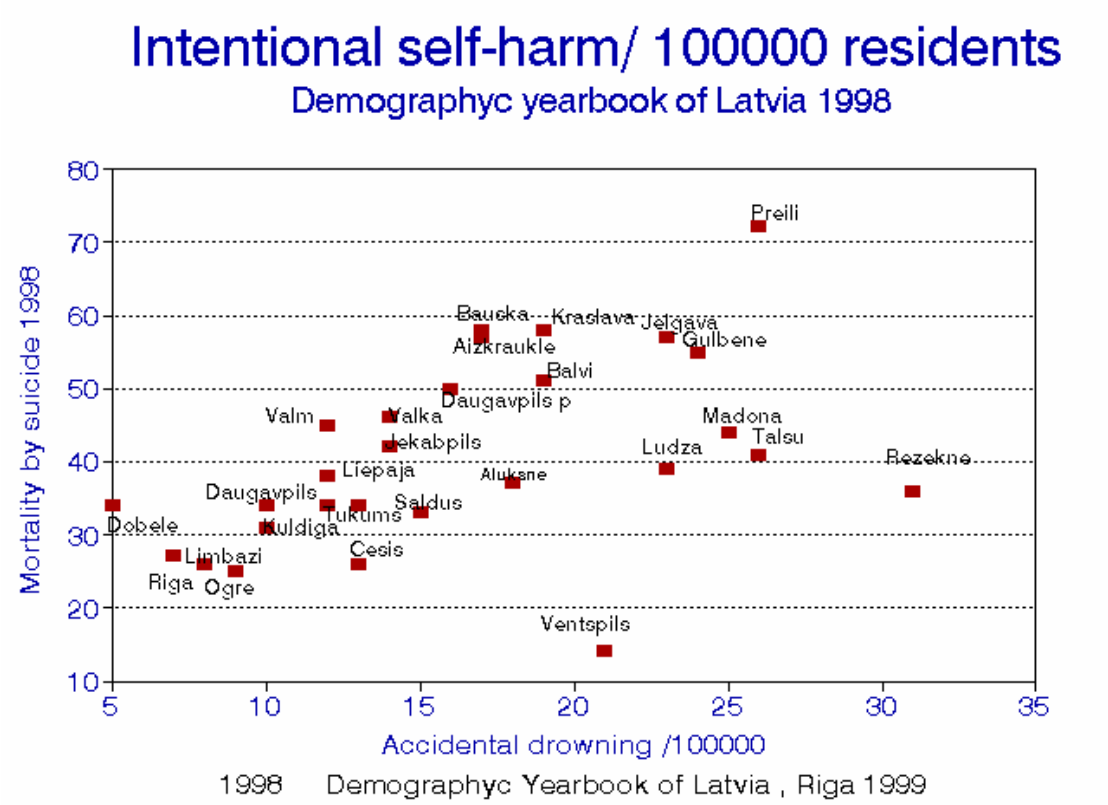


Fig.5.

X=Accidental drowning Y=suicide death

Regression Output:

Constant	25.8
Std Error of Y Estimated	11.3
R Squared	0.248
No. of Observations	30
Degrees of Freedom	28
X Coefficient(s)	0.91
Std Error of Coefficient	0.30

The suicide rate correlates with the number of deaths by accidental drowning. Accidental drowning is frequently used to characterise the unresponsiveness of rescue services. However, the close correlation between suicide deaths and death by accidental drowning maybe because accidental drowning should also be attributed to death by suicide. Both indices are laid down for different districts of Latvia. Only the case of Ventspils where drowning can be partly attributed to fishing, does not correspond to the estimated correlation. In Dobele, Riga Limbazi, and Ogre the downing accidents and suicide levels are low. They are districts with a better social situation than others.

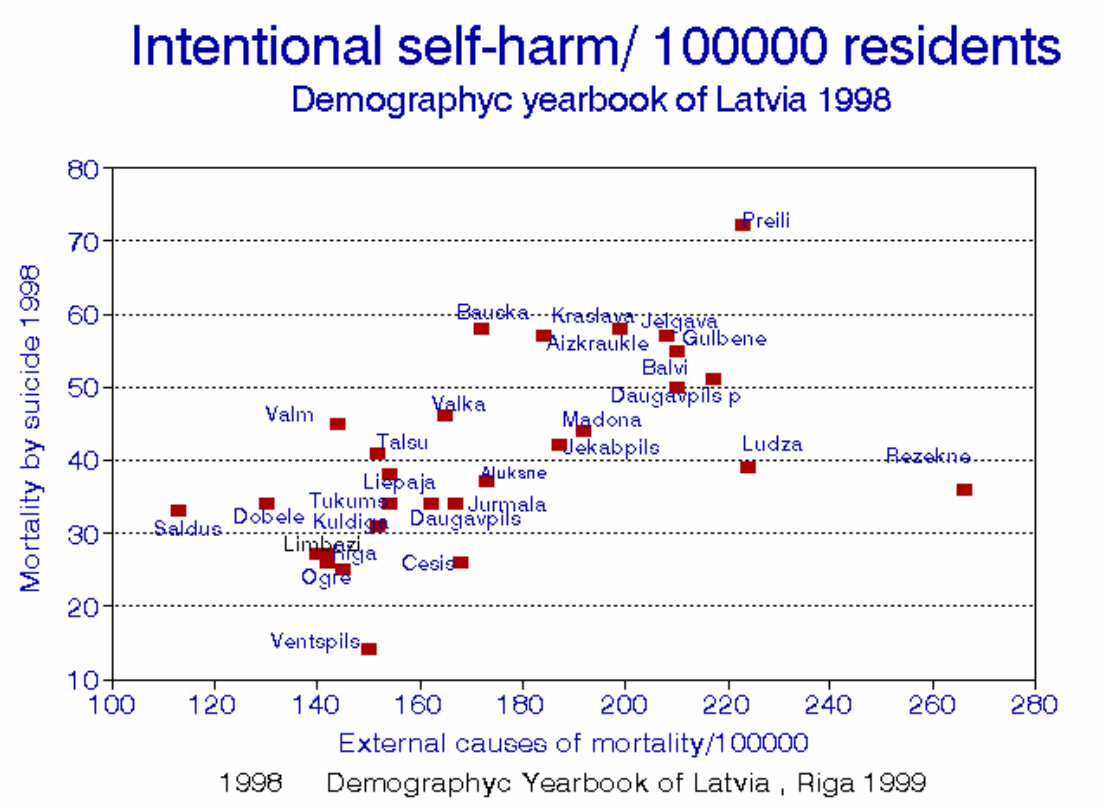


Fig.6.
X=External causes of mortality Y=suicide rate

Regression Output:

Constant	3	
Std Error of Y Estimate	10	
R Squared	0.336	
No. of Observations	30	
Degrees of Freedom	28	
X Coefficient(s)	0.216	
Std Error of Coefficient		0.057

The suicide rate correlates with external causes of mortality. The X coefficient is nearly four times higher than the standard error of the coefficient. If there was no mortality caused by external sources, then the suicide rate should be only 3 /100000 population. The correlation is so obvious that it is not ruled out that death classified as sudden death may be the death by suicide. There are fairly strong associations between suicides and socio-economic situation. One of the factors characterising the social economic situation is the estimated life at birth.

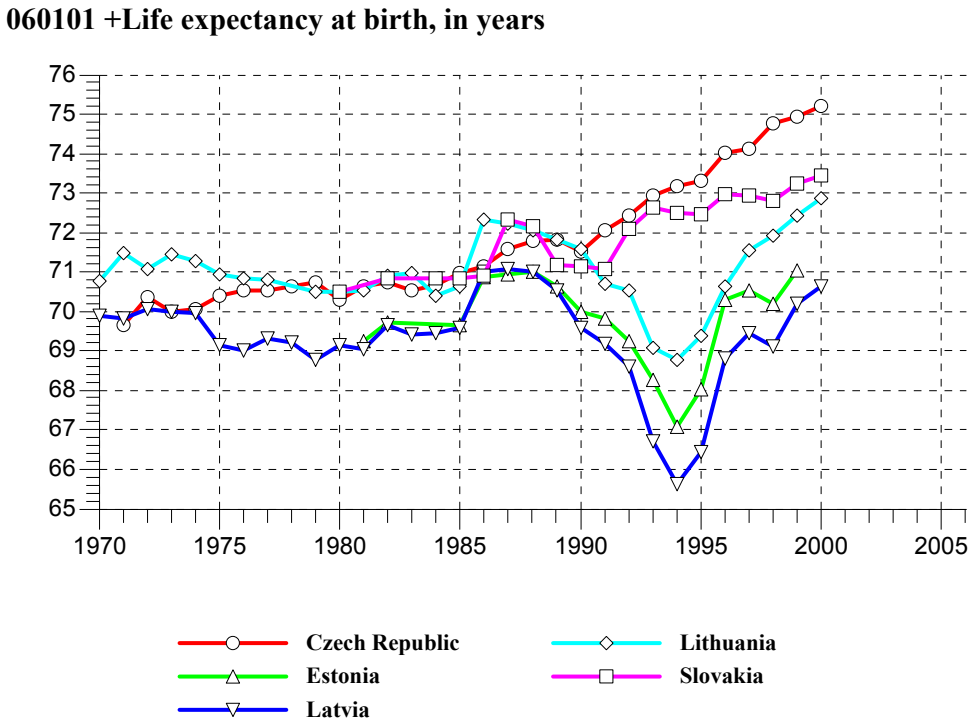


Fig.7. Life expectancy at birth has appreciably decreased during the switch over period from a planned economy to a market economy. In Latvia, the decrease is appreciably higher than in other Baltic States. In Czech Republic and Slovakia a slight increase can be observed after 1999. In Czech Republic the increase is slightly higher than in Slovenia.

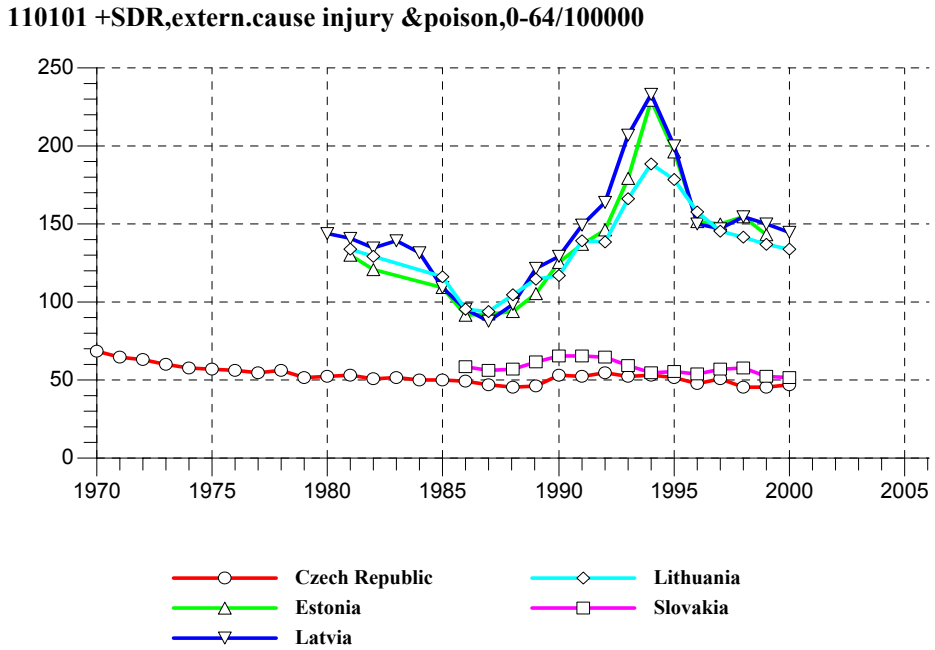


Fig 8. The death rate by external causes has the lowest rate just before the collapse of the Soviet Union. After that the death rate due to external causes has increased in all Baltic Republics. The highest increase is in Latvia, the lowest in Lithuania.

In Czech Republic and Slovakia there is a small increase after 1999. However, the death rates in Czech Republic and in Slovenia are very low compared to the death rates in Baltic States.

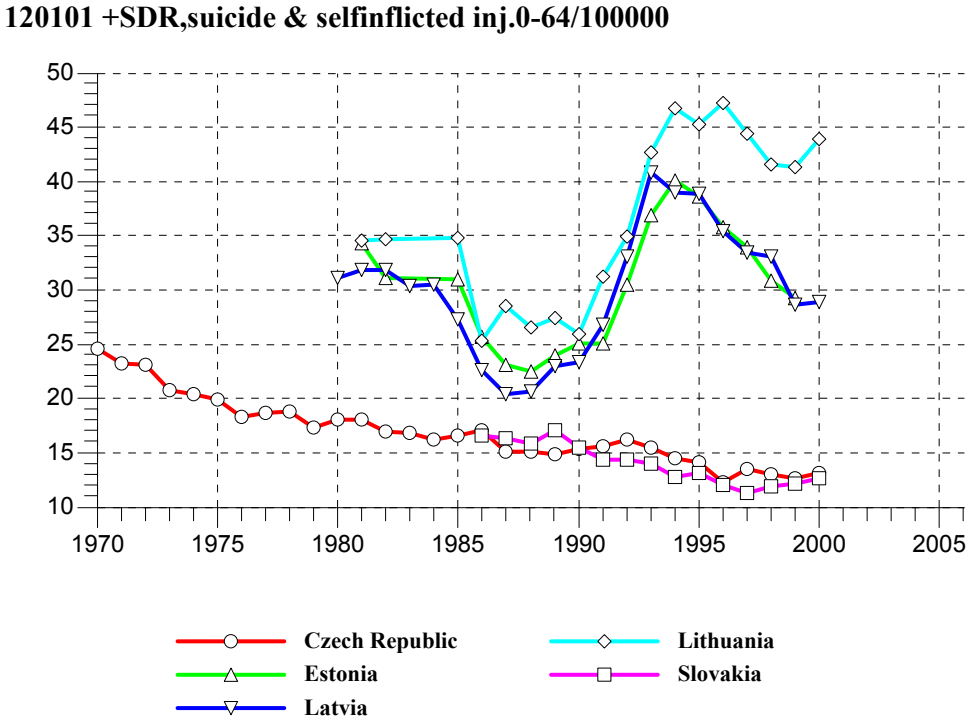


Fig.9. Suicide rate in Baltic States had reached the lowest values before collapse of Soviet Union. The destabilization period in which the death rate started to increase had been observed even before the establishment of independent Baltic States. In Czech Republic and Slovakia, the suicide rate had a tendency to fall during the whole period after 1970. This shows an increase in the quality of life.

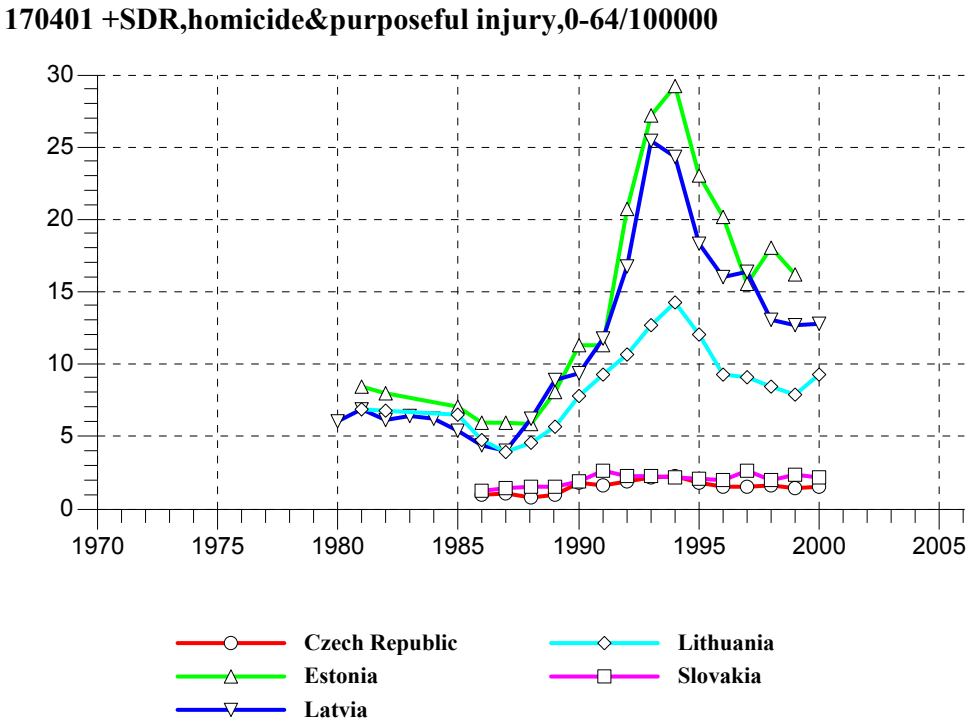


Fig.10. In Baltic Republics an increase in homicide rates during the switch over period from a planned economy to a market economy has been observed. The highest increment has been observed in Latvia and Estonia, and the lowest in Lithuania. In Slovakia and Czech Republic, only a very small increase has been seen after 1990. One can see that the suicide rate in Lithuania, divided by the homicide rate, is appreciably lower than in other Baltic States. Presumably Lithuanians are more self-aggressive than aggressive towards others. This may show their high responsibility towards their families.

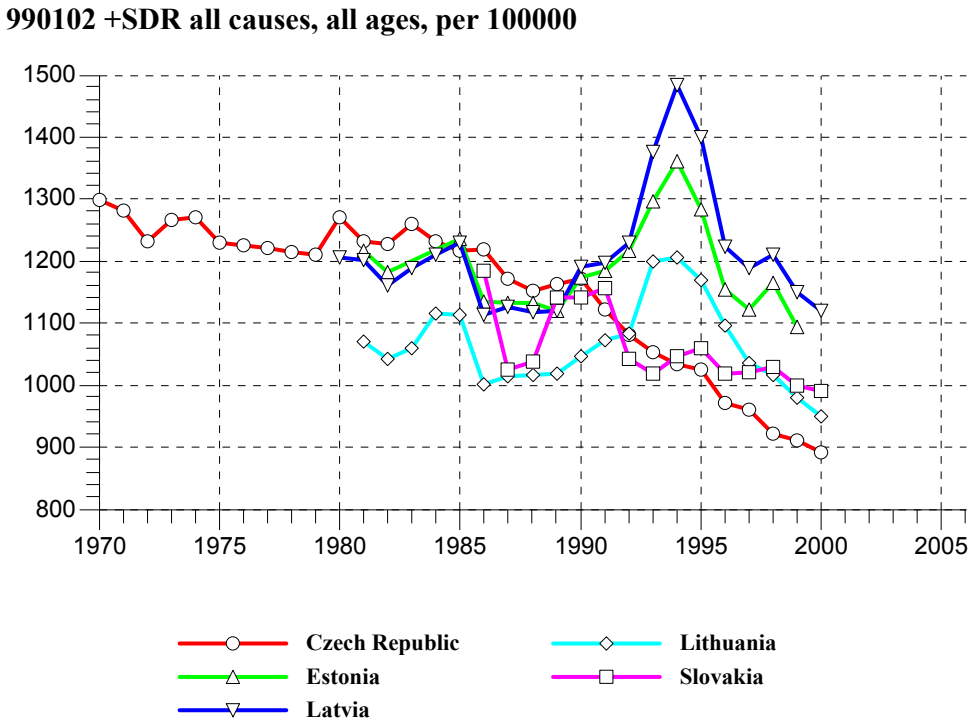


Fig. 11. Suicide rate due to all causes has a tendency to decrease. During the Soviet period the lowest values have been in Lithuania. After the Soviet period death rate in all Baltic States started to increase. The highest increment was in Latvia, the lowest in Lithuania. After the maximum, which has been attained in 1994, a decline has been observed. However in 1998 a slight increase could be observed. Presumably, it reflects a cold summer with low yields. The death rates in Czech Republic after 1993 have been decreasing more rapidly than the death rates in Slovakia. Obviously Czech Republic has better living conditions than Slovakia does.

Obviously the economic situation has worsened after independence. This has led to an increase in the suicide rates. How can the economic situation be improved in the poorer districts of Latvia? Well-devised information about past and present residents is needed.

These investigations have shown Latvian Statistics can give reliable information about the economic situation in Latvia. It should be mentioned that Estonian statistics gives more information about the land economy. Lithuanians statisticians should be appreciated as well. It should be mentioned the Statistics of Lithuania gives more information about farming. There is not only integral information, but also detailed information about regions. In this year, the yearbook of statistics of Lithuania is available in ROM discs. Data presented by modern information methods can be analysed to compile a history of economic development of these nations by interpreting the data of wages, health education and economic success. History, analysis, and statistics are used to provide a clear answer to complicated economic world. Therefore information for all three Baltic Republics is needed.

It is likely, that Latvia is a state where information technology is highly developed. Information technology should be used for better understanding between

different regions and the people living there. This could serve economic development, better understanding of economic and social demands of residents, and integration of the European Community.

Conclusion

By using WHO data, results have been obtained by dividing the suicide rates in 1990 to the suicide rates at 1995. An increment of suicides has been established in nearly all states that have had independence as a result of segregation of the former Soviet Union. Opposite trends have been observed in Muslim countries. Latvia and Lithuania are the countries with more pronounced increase in suicide rate. The increase in the suicide rate in female population is a little lower than in the male population. In most European countries, which were not coupled with the Soviet Union, the suicide levels decreased during this period.

Results obtained by using the statistics of Latvia have been laid down, as X -Y graphics where the year is the last two numbers of the year. Data revealed, that after restoration of independence in 1990, the suicide rate increased, reaching its maximum somewhere between the years of 1992 and 1995.

Infant mortality correlates with suicide death for males. The X coefficient is more than three times higher than the standard error of the coefficient. That means a high degree of confidence. If the infant mortality should be five (as in developed European countries), then suicide rate should be 18 (the suicide rate in Great Britain). The same is true for females. However, the suicide death rates for females are lower and the correlation between infant mortality and suicide death is a little lower than in the case of males.

Other investigations have been carried out by using Statistics of Latvia for land districts of Latvia. It is known that some land districts may be attributed to those with higher economic success, some with lower.

The suicide rates correlates with the number of registered alcoholics. Alcoholism (both alcohol abuse and dependence on alcohol) is a frequent diagnosis for those who have committed suicide. Increase in suicide risk among alcoholics is the worsening of social situation.

The suicide rate correlates with the number of deaths by accidental drowning. The close correlation between suicide death and death by accidental drowning maybe because accidental drowning should also be attributed to suicidal death.

The suicide rate correlates with external causes of mortality. The X coefficient is nearly four times higher than the standard error of the coefficient. If there was no mortality caused by external sources, then the suicide rate should be only 3 /100000 population. The correlation is so obvious that it is not ruled out that death classified as sudden death partly may be the death by suicide. HFA in Czech Republic and Slovakia show that the suicide and homicide rate are appreciably lower than in Baltic States. The Baltic States must go a long way to attain a quality of life such as that in Czech Republic and Slovakia.

It is believed that high suicide rate is a reaction to the stress situation due the switch from a planned to free economy. It may be speculated that the lack of

orientation to a market economy may be one of the reasons of a high suicide rate. Special attention should be applied to education, social, and psychological instruction.

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www.who.int/entity/mental_health/media/en/427.pdf

Ilmars Skards, Jekabs Raipulis, Ilga Karlsone*

Demographic Situation in Latvia and the Conditions which Limit it

Key words: HFADB, Latvia, Greece, Malta, EU, life expectancy, diseases of circulation system, death by external cause, birth rate, mortality.

Abstract: Data of World Heath Organisation HFDAB has been used to analyse:

1. The reaction of Latvians to switching over from a planned economy to a market economy
2. To look at some social indicators of the Czech Republic and Slovakia. Austrians have been analyzed in comparison. It has been shown that adverse reactions of inhabitants are the consequence of unfavourable environmental conditions. The results can be given to the students to determine the environmental factors that cause negative reaction of inhabitants.

Introduction

Latvia still has one of the lowest birth rates and the highest mortality rates in Europe. Only during the last three years, the birth rates have increased negligibly. However, they are lower than the mortality rates. If these trends continue, depopulation will follow.

This situation resulted from several factors:

1. The undesirable political situation in the 20th century, high losses of population during the First and Second World War, emigration, escape from totalitarian regimes, and deportation are some of the reasons why the social and economic situation worsened. As a result, normal male and female relations have been destroyed. Many children are in incomplete families and in boarding schools. In the 20th century, Latvia lost 1/3 of its inhabitants.

2. The current adverse economic situation and the income level of the middle class is low, especially among peasants. They are the main generators of the population. The worsening of the economic situation results in the draining of scientists. More than 10% of scientists are working abroad and are not ready to return. Emigration is also common among medical personnel and other professionals who wish to earn money.

3. The psychological situation in the transition period. There were severe transition difficulties due to the change in the economic system. The previous system did not develop initiatives in decision taking. Therefore, people did not adapt to the new situation well. They fear to lose their jobs, alcoholism develops and the suicide

* Ilmars Skards, University of Latvia, Latvia
Jekabs Raipulis, Pedagogical High school And the Management of Education. Riga Latvia.
Ilga Karlsone, University of Latvia, Latvia.
e-mail: skards@lanet.lv

rate increases. Homicide goes in parallel with suicide. The death rate increases because of violation, drowning and other external causes. This increase is especially high among males. Families are divorced

4. A decrease has been observed in moral and ethical values. In a free market economy there are a lot of "temptations". The heritage from the command system: It stimulates prostitution, homosexuality and other deviations in sexual behaviour. As a result, children are neglected by their parents. Children and adults are busy with games, which may have negative influence on children. And they get dependent on narcotics

5. Decrease in the health condition. Unsuccessful reformation by the system, changing the wealth distribution for healthcare does not secure healthcare for the lower classes. An increase in sexually transmitted diseases lowers reproductive health. Lacking quality of food impairs the health of lower class people.

6. Another reason for the decline in social values is people's materialistic disposition. The low value of family institutions, health, needs of the family, and needs of children in comparison to other values (chiefly material ones) does not help to improve the demographic situation.

Theses are the main factors, which have worsened the demographic situation in Latvia. Many scientists, the government of Latvia, and public organisations are investigating how to deal with the environment and the adverse demographic situation. Most of these factors are present in other Eastern European countries. We believe these problems need to be discussed in an International forum (Yearbook of Latvian Statistics 2002).

Difficulties in adapting may arise from rapidly changing patterns of land use and changing industries. Thus was the situation after the collapse of the Soviet Unions and the switchover to a market economy. There are no people who investigate the market and improve the quality of goods. It was thought that factories and farms should be privatised and production would automatically increase and the owners would get rich. Scientific institutions from Soviet times were the first to be liquidated, because the new owners were thinking only about instant earnings and not about sustainable development. This led to a form of production which was not ready for the market. The new owners had the right to sell the equipment if it was necessary to cover payments. This caused the factories to go bankrupt. This led to increased unemployment. The owners, however, became rich because the equipment was very often coloured and rare metal. Economists claim that it was a period of primary accumulation of capital. A period of investments in production would follow. One cannot agree with this, because desegregating the factory means a wastage of capital, not an accumulation, because the capital of the whole factory is very high in comparison with the capital acquired by the sale of equipment. Lack of information as to what to do, how to escape from negative influence, or incapability of action lead to a stress situation. A good example of switching over from a planned economy to a market economy may be the example of Slovenia. An example of such a transion with nearly no losses may be the example of Austria.

Stress situations may cause undesirable effects on the health of people. Studies and surveys in the USA (American Heart Association 2003) explain the medical basis of stress, depression, anxiety, and drug abuse. For instance:

- 70 to 80 percent of all visits to the doctor are for stress-related illnesses.
- People who experience high levels of anxiety are four to five times more likely to die of a heart attack or stroke.
- Stress contributes to approximately 50 percent of all illnesses.
- Stress-related injuries on the job have increased from 5 percent to more than 15 percent of all occupational diseases during the past 10 years.

The aim of the current work is to analyse the consequences of stress situations for the inhabitants of a country which has changed from a market to a planned economy. The analysis shows that stress situations lead to very high health costs for society. The "costs" are very high in Latvia, very low in Austria, and a little higher in Slovenia.

Materials and method

Data has been obtained from World Health Organisation from HFADB. Changes as a function of time gave the possibility to determine reaction from the environment to the inhabitancy. Detailed investigation may be the task of students and may serve as an education method.

Results and discussion

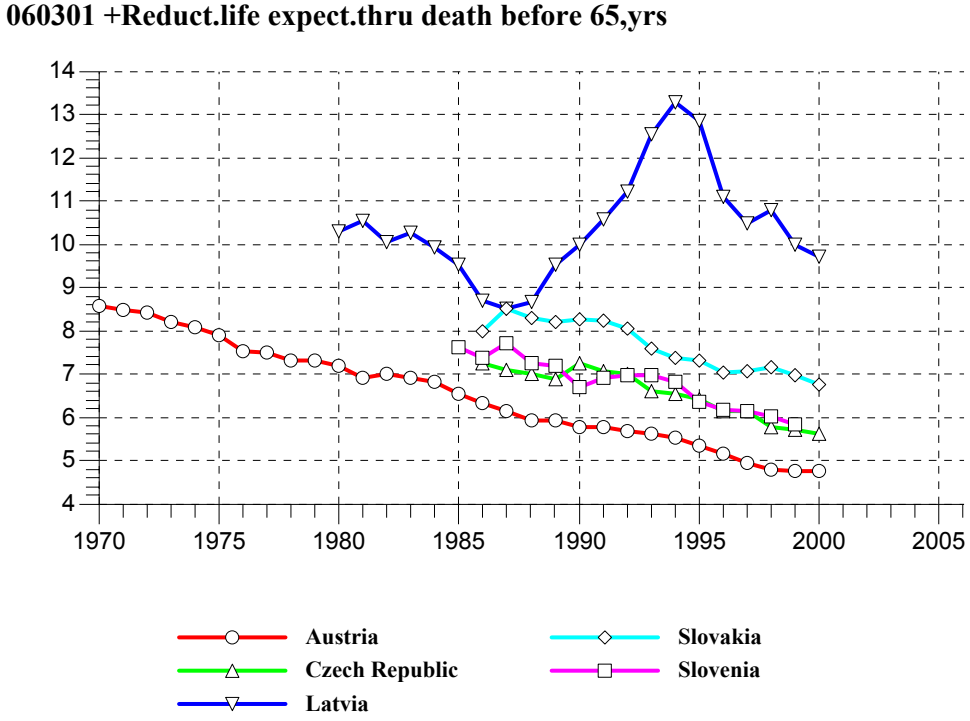

Fig.1 In Slovakia and the Czech Republic, there is a small increment of reduced life expectancy by death before the age of 65. In Slovakia, reduced life expectancy by/due to death before 65 years of age is higher than the values in the Czech Republic.

In Latvia, reduced life expectancy by/due to death before 65 years, before 1985, trended to decrease steadily. After 1985 and till 1987, a steep decrease can be observed. This may linked to Gorbachov's liberalisation ideas: After 1990, reduction of life expectancy by/due to death before 65 years began to increase. A maximum increment was observed in 1994.

Another less defined maximum can be observed in 1998.

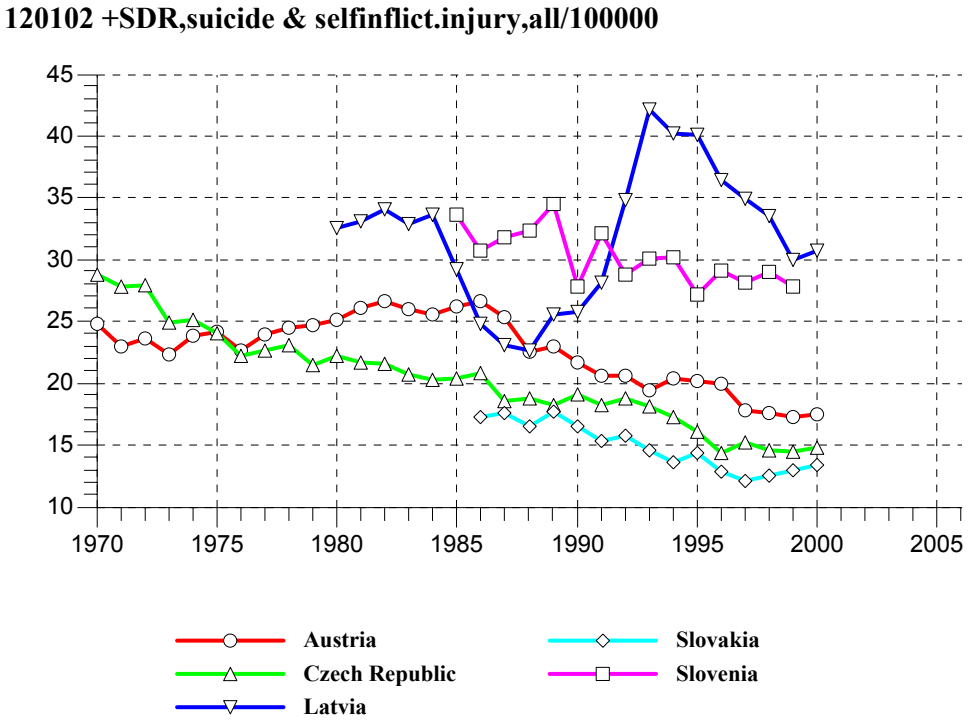

Fig.2 In Slovakia, the suicide rates are very low. In the Czech Republic the suicide rates are higher than in Slovenia. Slovakia has lower suicide rates than the Czech Republic. However, after separating from Czechoslovakia, the gap decreased.

The suicide death rates in Latvia are high. They are oscillating. An appreciable decrease of suicide rates in Latvia was observed after 1985, when Gorbachov's liberalisation ideas had an impact. After getting independence (as of 1990), the suicide death rates in Latvia rose. After 1993, the suicide death rates decreased again.

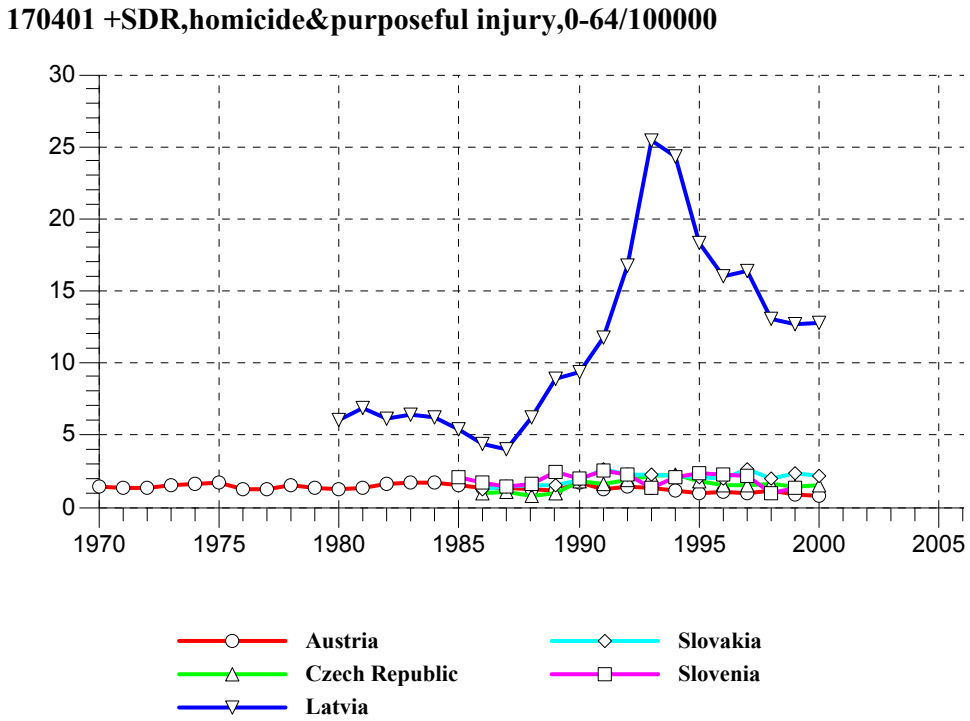

Fig.3 After independence, mortality by homicide increased. The maximum increase was in 1994.

The homicide rates are high in Latvia. A period of lower rates was observed after 1985. That is the Gorbachov period. They especially increased during the switch over period from a planned to a market economy. This period can also be recognised as a complex of different events, which led to the sharp increase of 1993.

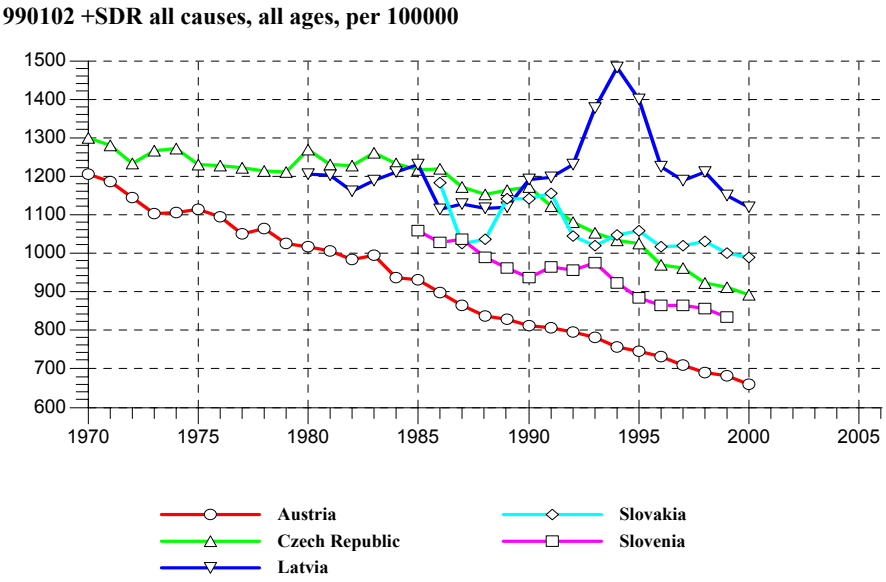

Fig.4 In 1983, the socialist government fell. A small increase of death rates can be observed. Socialists were forced to form a coalition with the far-right Freedom party. Austria captured the attention of the world in 1986 when former UN secretary-general Kurt Waldheim was elected president despite

allegations that he had been involved in atrocities as a German army staff officer in the Balkans during World War II. Also in 1986, the Socialists (subsequently the Social Democrats) and the People's party again joined in a "grand coalition," with Social Democrat Franz Vranitzky as chancellor. This was a time of decreasing death rates. Austria began a partial privatisation of state-owned industries in the late 1980s and entered the European Union (EU) in 1995. During privatisation, a negligible stagnation of the death-decreasing trend could be observed. After Waldheim handed over the presidency to Thomas Klestil in 1992, the candidate of the People's party, there was again a small fall in the death rate. In 1997, Chancellor Vranitzky resigned and was replaced by Social Democrat, Viktor Klima. In the October 1999 elections, the People's party was placed third, just barely behind the far-right Freedom party, whose leader, Jörg Haider, was criticized as demagogic and nativist. The electoral results complicated the formation of a stable new government, which was only achieved in February, 2000, when Wolfgang Schüssel of the People's party, became chancellor of a People's party-Freedom party coalition. Austria was quickly ostracized by other EU nations because of the Freedom party's participation in the government, and Haider who had not joined the government resigned as party leader. The sanctions imposed by the EU came to be regarded as threatening by smaller EU countries. However, on the recommendation of a EU fact-finding commission they were lifted in Sept. 2000. (Austrian history 2003, Articles 2003).
After the collapse of the Soviet Union, there is a small increment of death rates in all four countries. In Slovakia, it is more pronounced and in the Czech Republic less pronounced.

In Slovakia, before splitting up from Czech Republic, the mortality rate from all causes was lower than in the Czech Republic. Now the situation has changed. The death rate due to all causes in Latvia is high. The highest rate was in 1994; lower peaks were attained in 1990 (when the Soviet Union collapsed), in 1998 (cold summer and breakdown of banks in Russia), in 1984 /85 (the period of Tschernenko). The increase in death rates due to all causes after 1990 was also observed in Slovenia. The increase was very low in comparison with the increase in Latvia. In Austria, the death rate went down very rapidly between 1970-1973. That was a successful period for Bruno Kreisky's government (Austrian Information service 2003). In the National Council elections of 1970, the People's Party lost its absolute majority. The Socialist Bruno Kreisky initially formed a minority cabinet, which enjoyed the support of the Freedom Party. After the adoption of new voting legislation, this benefited the smaller parties. During the second election in 1971, Kreisky gained a clear majority. As a single-party government, the Socialists continued to pursue their policy of general liberalization and openness, while their efforts towards democratisation and increased emancipation in a number of different areas found approval with their voters. With its good international connections, the Kreisky government's foreign policy enhanced Austria's position in the world. The prevailing economic boom facilitated the Socialist Party's advance to a middle-class workers' party.

A small increment of death rates due to all causes could be observed in Slovenia after 1990. After the war (1945), Slovenia was made a constituent Republic of Yugoslavia and received a part of the former Italian region of Venezia Giulia. In early 1990, Slovenia elected a Non-Communist government and stepped up its demands for greater autonomy with the threat of possible secession. In February 1991, the Slovenian parliament ruled that Slovenian law took precedence over Federal Law. Slovenia declared independence on June 25, and Federal troops moved in, but after some fighting withdrew by July. The European Community and the United Nations recognized Slovenia along with Croatia as an independent country in 1992. Milan Kuan was elected president of Slovenia in 1990 and continued as president of the independent Republic. He was re-elected in November, 1997. (Encyclopaedia. com powered by eLibrary 2003)

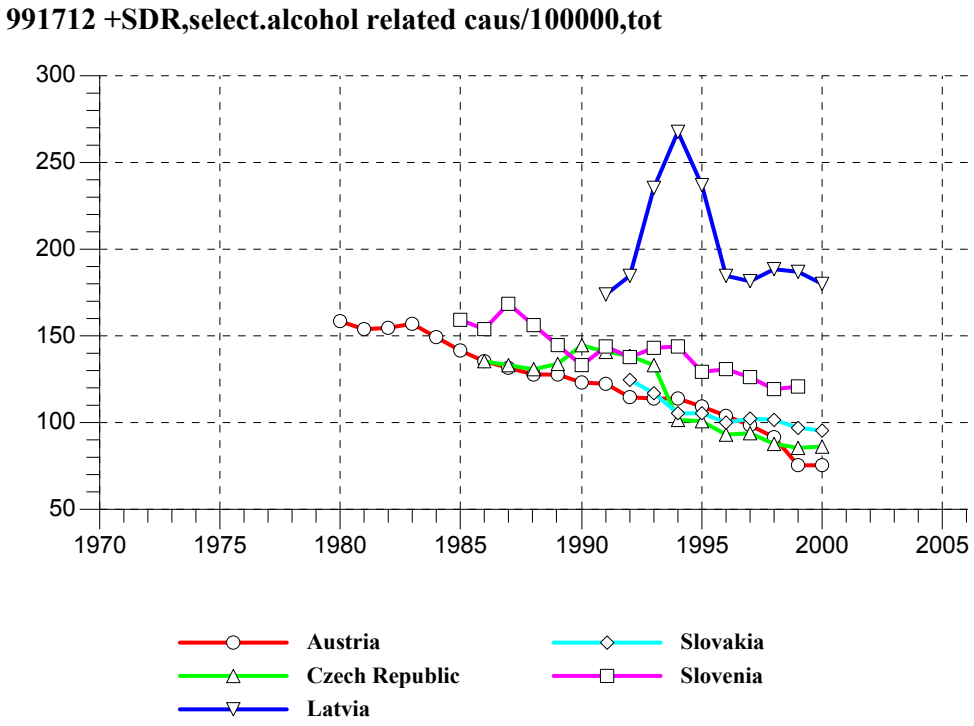

Fig.5 After the breakdown of the Soviet Union, the death rate due to alcohol consumption in the Czech Republic increased. Before splitting up from Czechoslovakia, Slovakia had lower death rates due to alcohol consumption. After splitting up, the situation changed. Slovenia, which is thought to be a very stable country, has increased death rates due to alcohol abuse after 1990.
The death rate due to alcohol related causes in Baltic States is appreciably higher than in the EU. After restoration of independence (after 1990), death rates increased. Maximum death rates exist in Latvia. A slight rise was observed in 1988.

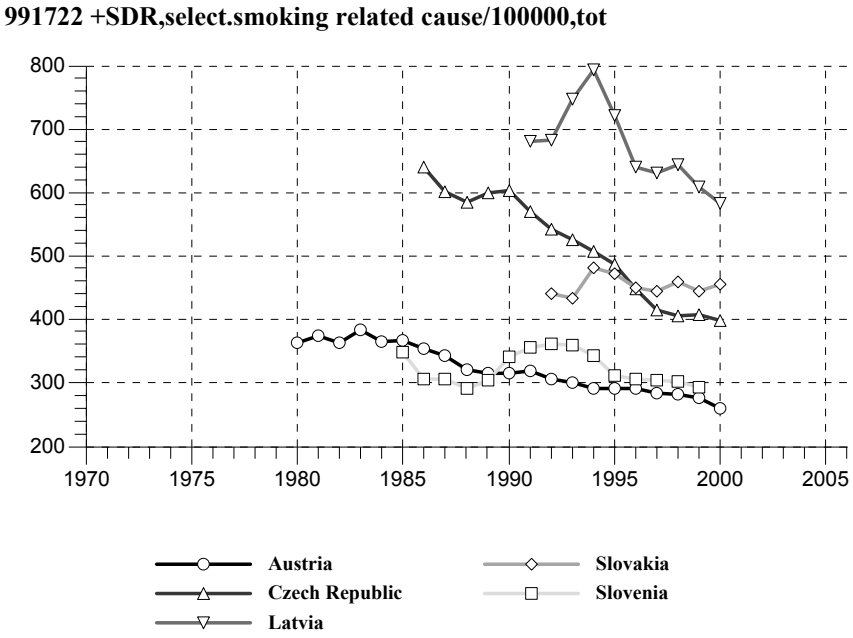

Fig.6 In Slovenia, after the switch over from a planned to a market economy, one can see a small rise in smoking related deaths. Slovakia, after splitting up from Czechoslovakia, showed an increase in death rates due to smoking. The peak was observed in 1994. In the Czech Republic, the peak was significantly lower. Before splitting up from Czechoslovakia, Slovakia had lower death rates due to smoking related causes. After splitting up the situation changed. In Latvia, the smoking related death rates are very high. The maximum was reached in 1994.

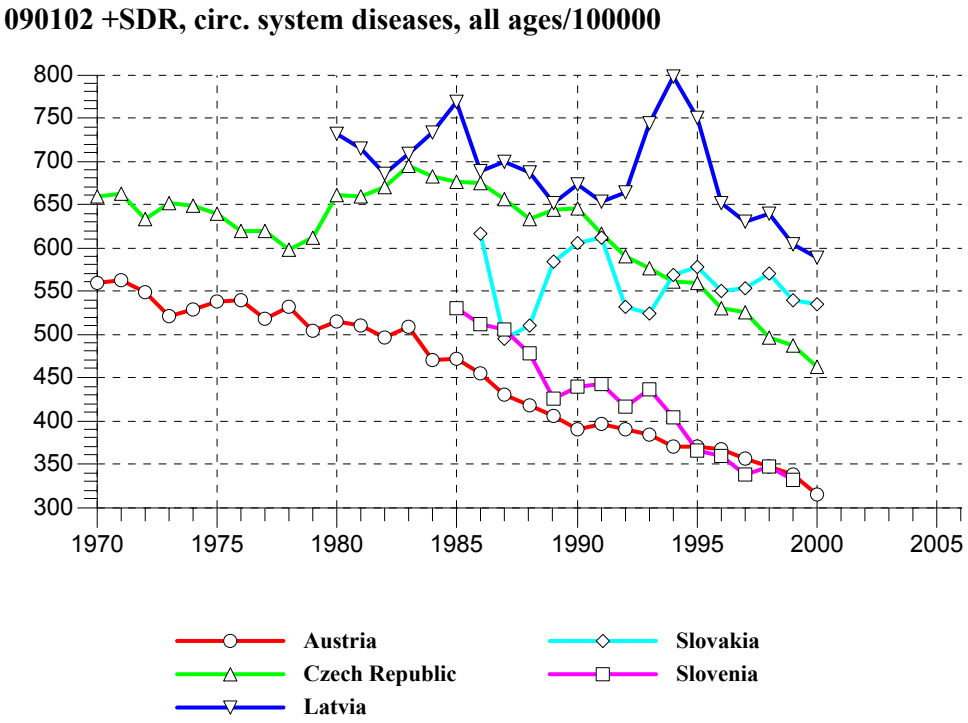

Fig. 7 This figure differs from the next one with respect to age group. In this figure all age groups are included, in the next – only ages below 64. Before splitting up from Czechoslovakia, Slovakia had lower death rates due to circulation diseases than the Czech Republic. After the separation, the situation changed. In this drawing, the crossover does not take place before 1994. In the next drawing, the crossover takes place earlier. Presumably, Slovaks are more sensitive compared to Czechs. In Latvia, there is a high amplitude between the years 1980 and 1990. In the next figure, this oscillation is lower. Presumably, the maximum related to the year 1994 is characteristic for the younger generation. The stress situation has greater impact on the younger generation than on the older one.

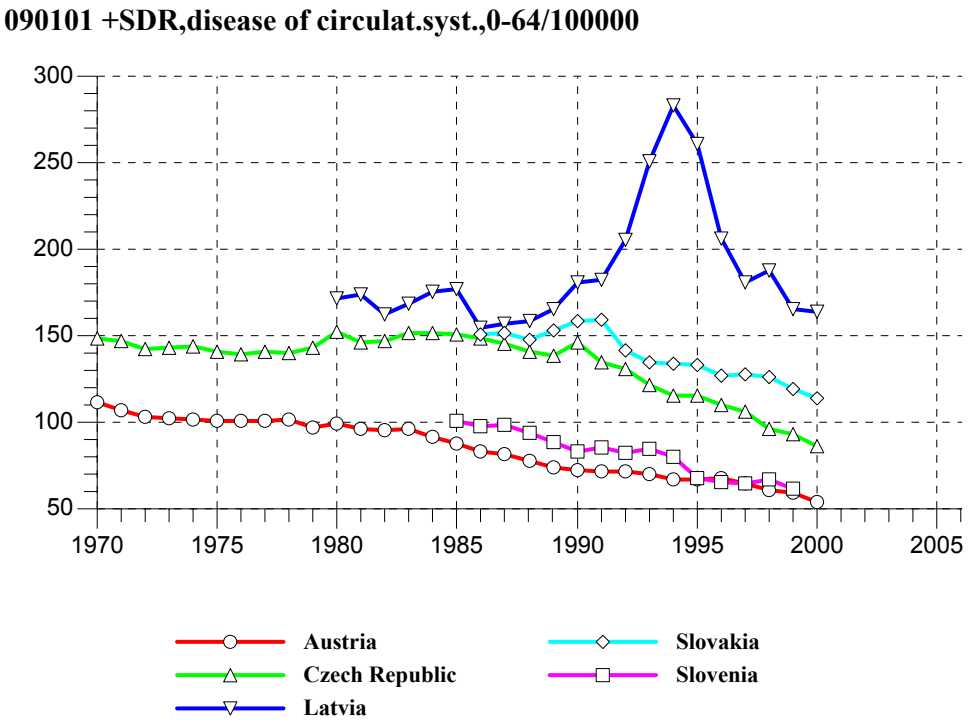

Fig.8 The death rate from blood circulation diseases in Slovakia was higher than in the Czech Republic. The maximum rate in both countries was in 1990. That coincides with the time when Latvia had the first maximum. The increment of the death rate from blood circulation diseases in 1990/91 in Slovenia was higher than in the Czech Republic. Further development has shown that the gap between both states increased. In Slovenia, a small increase in the death rate from blood circulation diseases can be observed after the switchover from a planned to a market economy. The lowest increase was in Austria. Obviously, this is a country where people have adapted to decision making in a democratic manner, which helps to avoid stress situations. The peak for Latvia is in 1985. It is low (approximately 1/6). In the previous figure, it was approximately 1/3). Consequently, the peak is characteristic for employed persons (the previous figure is for employed and unemployed)

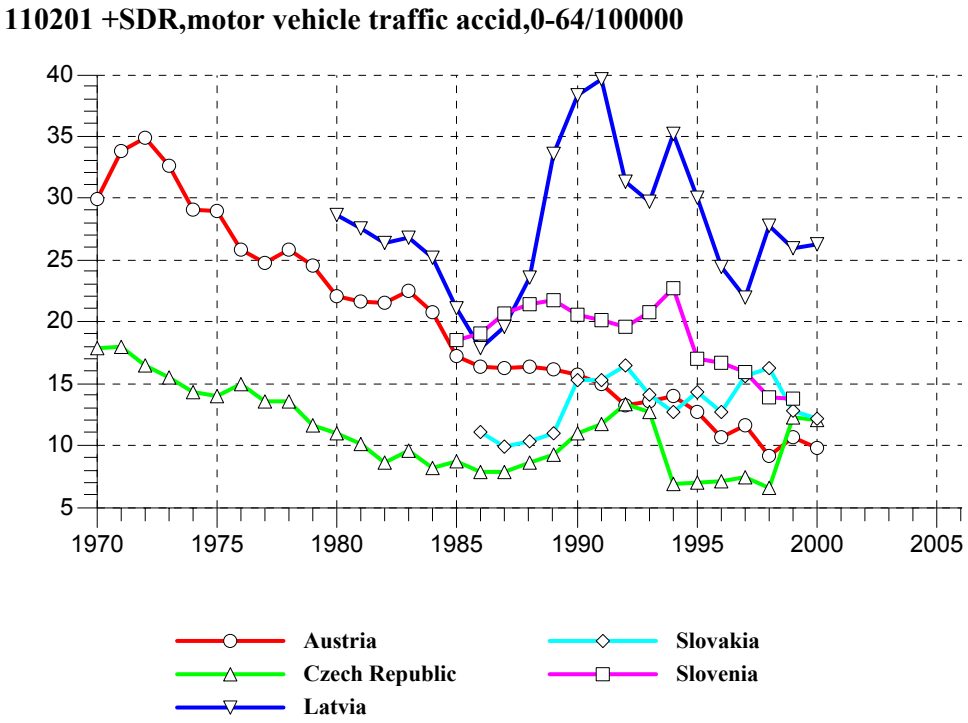

Fig.9 Death due to motor vehicle traffic accidents is a good indicator of the stress situation. For example, in Austria in 1983, the socialist government fell and the death rate was high. In Austria privatisation began earlier than in Soviet block countries. This is reflected in death due to motor vehicle traffic accidents.
In 1997, Chancellor Vranitzky resigned and was replaced by Social Democrat Viktor Klima. In October 1999, elections took place. At the same time an increase in deaths due to motor vehicle traffic accidents can be observed.

Motor vehicle traffic accidents in Slovakia are higher than in the Czech Republic. In Slovakia, two high increases were observed in 1992 and in 1998. This is the stress period of switching over from a planned to a market economy.

In Slovenia, the highest increase of deaths due to motor vehicle traffic accidents has been observed to be in 1994. That is the period of maximal stress situation by switching over from planned to market economy.

In Latvia, the amplitude of death rates due to motor vehicle traffic accidents was significantly higher than in former Austro-Hungarian countries. The first decrease was during Gorbachev's era in 1985 (Cajo 2003). A stress period followed after independence. The corresponding peaks were in 1991, 1994, and 1998.

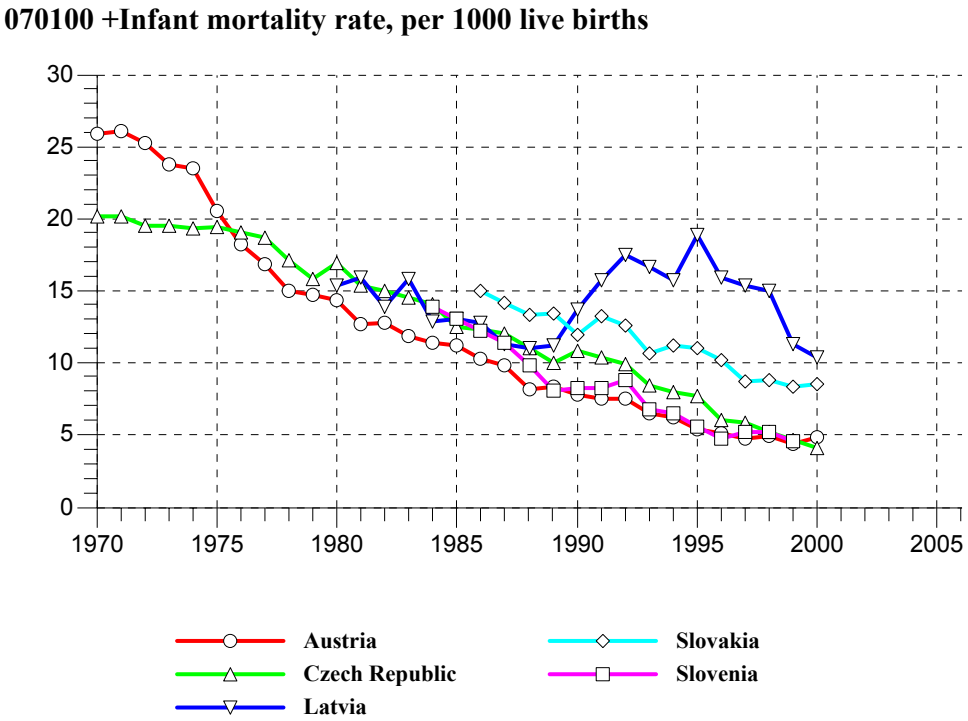

Fig.10 In Austria, a decrease in infant mortality was observed during the era of Kreisky (1979-1983) (encyclopedia.com powered by eLibrary 2003). Infant mortality for Slovakia is higher than for the Czech Republic. A lowering of the rate for both countries occurred in 1993, that is the period of independence. Further development has shown that the gap between both states has increased.

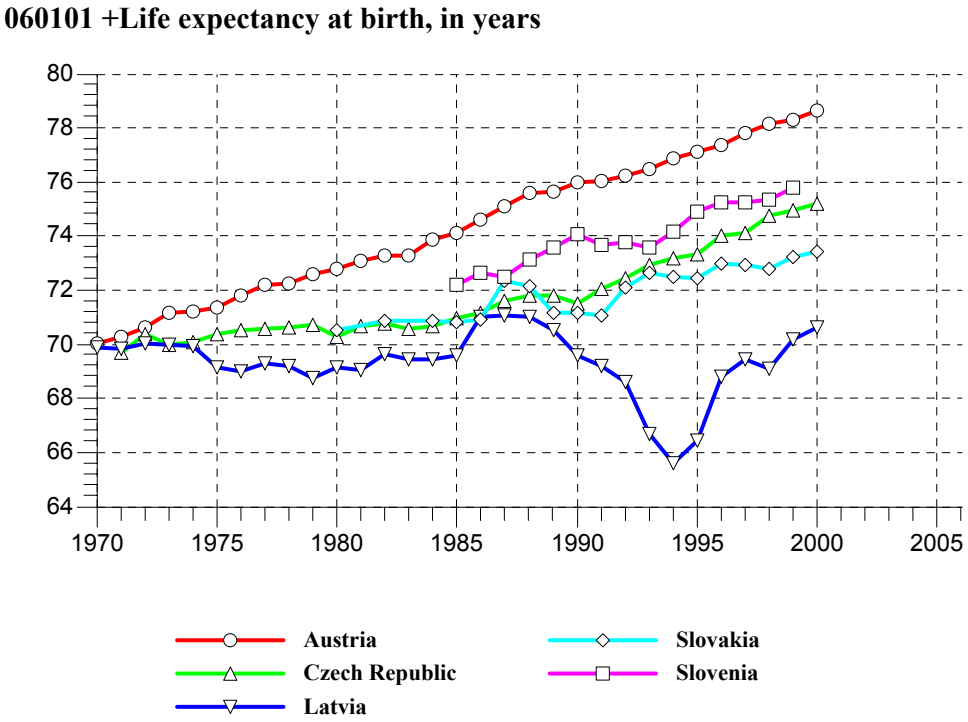

Fig.11 Life expectancy at birth increased very rapidly in Austria. However, the increase was not so even. For example, in 1983, the increase diminished. In 1983, the Socialist government fell and the Socialists were forced to form a coalition with the far-right Freedom party. Austria began a partial privatisation of state-owned industries in the late 1980s and entered the European Union (EU) in 1995. The time after privatisation could not be characterised as a time with an increase in life expectancy at birth. Life expectancy at birth in Slovakia is the lowest in 1990. It is lower than the values for the Czech Republic. A tiny lowering of the expected life time was observed after independence. Further development has shown that the gap between both states has increased.

The time of Breschnev was a bad time for Latvia – The life expectancy at birth had decreased till 1982. During the era of Andropov (1982-1984), life expectancy at birth rose a little. The era of Gorbachov (1985-1990) increased the life expectancy at birth. The epoch of independence brought a decrease in life expectancy at birth. In this period as well, several maximums were observed. One in 1990, in 1994, and in 1998. In comparison with Austria, life expectancy at birth in Latvia is low- from 1970 till 2000 there is nearly no increase.

Conclusion

1. In Latvia, different periods can be observed. One period is the era of Breschnev (1966- 1982). This is a bad period. The life expectancy at birth decreased. After that comes the period of Andropov (1982-1984) when life expectancy at birth shows a small rise. The rate of life expectancy at birth was significantly higher during Gorbachov's time. The independence period of Latvia (the time after 1990) follows. The era of independence revealed a decrease in life expectancy at birth. During this period, there were several maximums. One is in 1990, the other1994, and next in 1998. In comparison with Austria, life expectancy at birth in Latvia is low. From 1970 till 2000 there is nearly no increase. One can believe that the temporary decrease in life expectancy at birth is linked to situational stress – an event which results from the difficulties encountered when switching over from a planned to a free market economy. Such a hypothesis is reinforced when we examine the dynamics of blood circulation diseases. The increase in death rates due to these diseases provides the same pattern as death rates due to other illnesses that could be related to stress situations (death by abuse of alcohol, smoking, motor vehicle traffic accidents, infant death, homicide, suicide, and others).

2. This paper has been presented in Brno. Therefore, some data from former Austro-Hungary States has been presented. By observing states before and after division, it is possible to estimate whether the division gave positive results. It is likely that Slovakia's split up from Czechoslovakia give some results that can be interpreted as a worsening of the socio- economic situation for Slovenia. The decrease in life expectancy as a result of death before the age of 65 in Slovakia is higher than in the Czech Republic. After the split up, the relative difference has been increasing. Slovakia has lower suicide rates than the Czech Republic. However, after

splitting up from Czechoslovakia, the gap decreased. After the breakdown of the Soviet Union, the death rate due to alcohol consumption in the Czech Republic increased. Before splitting up from Czechoslovakia, Slovakia had lower death rates due to alcohol consumption. After splitting up, the situation changed. Before splitting up from Czechoslovakia, Slovakia had lower death rates from smoking related causes. After splitting up, the situation changed. The death rate from blood circulation diseases in Slovakia was higher than in the Czech Republic. The maximum in both countries was in 1990. That coincides with the time when Latvia reached its first peak. Further development has shown that the gap between both states increased. Life expectancy at birth and infant mortality in Slovakia did not improve as rapidly as they did in the Czech Republic after the split up from the Sovjetunion.

3. In former Austro-Hungarian States, the same stress situation linked events as in Latvia have been observed, with the exception that the deviation of socio-demographic indicators is much narrower. Even small deviations led to a change in government policy.

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A. Goldsteins*

State Forest Certification Activities in Latvia

Summary

Latvia has the largest forest area among the Baltic States, totaling 2.8 million hectares. One half of that is owned privately, and the other half belongs to the state and is managed by the state joint stock company "Latvijas mezi" (Forests of Latvia's State).

The main export markets for Latvia are in Europe and Great Britain. Latvia being a leading market for sawn timber, wood based panels, etc. Foreign customers demand certified wood products that can be obtained only from certified forests.

According to the Forest Stewardship Council (FSC) approximately 50% of the State Forests of Latvia will be certified by the year 2003. As a result of the certification beginning Spring of 2001 597990 ha have been certified upto July 2002.

Key words: forest, protection, certification, Forest Stewardship Council − FSC, certified wood products, Latvia, ecosystem.

1. Introduction

The beginning of the Forest Stewardship Council (FSC) certification process in Latvian forests dates back to 1995 when the "Certification Office of Forestry" was founded. It was financed by the state budget. Due the lack of funds the Office stopped its activities in 1997.

By the initiative of the Latvian section of the World Wide Fund for Nature (WWF) an initiative group of Latvian forestry certification was founded in 1997. The activities of the group are financed by its members: 26 public and private organizations including the WWF Latvian section.

The objectives of the group are:

- To work out the Latvian forestry certification standard in compliance with the requirements of FSC;
- To popularize the FSC` forest certification as a means for the improvement of forest management;
- To inform and educate the society in Latvia about the principles and necessity of the forest management;

During the course of activities there were several discussions about forest certification in which the representatives from Great Britain (WWF Buyers Group 95) also took part. The participants of the discussion were introduced with the system of the wood product supply channels for the tracing down the accounting and flow of timber products.

* A. Goldsteins, Dr. ing. sc., University of Latvia, Faculty of Economics and Management, e-mail: brigita14@lv.118

At the same time the society and interest groups were instructed about the necessity of forest certification by means of mass media, especially, magazines and newspapers, about forest certification necessity.

There is still a problem of conformity of opinions amongst forestry specialists about some forest certification questions.

The aim of this article is to analyze State Forest certification and protection processes in Latvia.

2. State forest certification process

Approximately 45% of the Latvian territory is covered with forests. The total resources count for 546 million m3. The annual increase of the renewable resource of forests is 16 million m3. The annual logging quota, stated by the Parliament of Latvia, is 10 million m3.

Since year 2000, a newly established organization called the State Stock Company "Forests of Latvia's State" has taken over the management function from the State Forest Service. The main aim of the State Stock Company is to manage state forests in a way that it provides the state and society with regular and increasing income. At the same time it is very important to keep and protect the forest as an important element of the entire ecosystem.

Depending on the location the state forests in the territory of Latvia are managed by 8 forestry districts (Table 1).

Table 1: Forestry zoning and management area

Forestry District	Management Area, ha	Information about certification
Austrumvidzeme	205126	Obtained FSC certificate - 2001
Dienvidkurzeme	247283	Audit is being done
Dienvidlatgale	188135	Planned to certify up to 2002
Rietumvidzeme	223572	Planned to certify up to 2002
Vidusdaugava	186329	Obtained FSC certificate - 2002
Zemgale	156061	Planned to certify
Ziemelkurzeme	235599	Planned to certify
Ziemellatgale	20661	Obtained FSC certificate - 2002

Receiving an FSC certificate, means that all these forest districts have confirmed that will manage the forests according to the principles of sustainable maintenance of forestry, which state the balance of economic, social and ecological objectives.

As a result of forest certification the domestic producers of timber products will be able to buy about 880,000 m3 of certified timber this year, which will have the FSC logo. The business partners must be aware of the fact that only wood processing enterprises, which have the FSC supply channel certificate, have the right to use the FSC logo.

An international audit is planned for three certified forestry districts twice a year, which is conducted by the certification establishment accredited by FSC. In case of non compliance with the requirements, the forestry may lose a certificate.

Apart from certified forests, 21 FSC supply channel certificates are issued to the following enterprises (Table 2)

Table 2: Channel certified enterprises

Ltd "Lignos"	Ltd "Vudlande"
Ltd "Kandavas koks"	Stock Comp. "Latvijas finieris"
Ltd "Tehnoserviss"	Ltd "Mebelu platnes"
Farm "Ozoli"	Ltd "4M"
Ltd "Valkas mezi"	Ltd "Malteks"
Stock Comp. "Strencu Mezi"	Ltd "Rondeks"
Ltd "Rona"	Ltd "Nelss"
Ltd "CED"	Ltd "Tezei-s"
Ltd "Mezrozite"	Ltd "Piladzi-2"
Ltd "Jelgavas Mezi"	Ltd "Vidzemes mezsaimnieks"
Ltd "Korness"	

Ltd "Malteks" and Ltd "Rondeks" are the first enterprises in the Latvian furniture industry that have received the FSC timber product supply channel certificate.

3. The analysis of the amount of logging and renewal of forests

Fig.1 shows the amount of logging in private forests, state forests and the total amount in the period between the year 1992 and 2001.

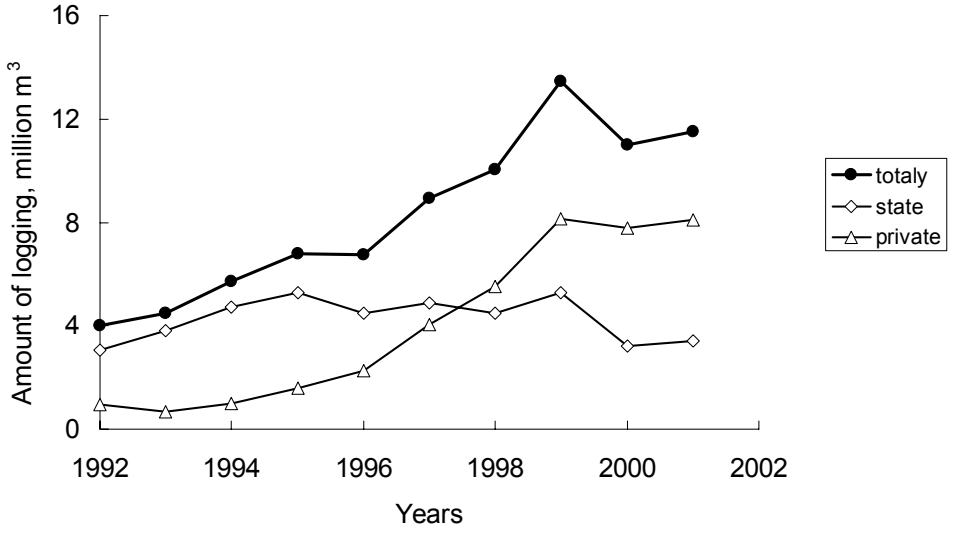

Fig.1. Amount of logging in private forests and state forests.

In private forests, the number of felled trees in the year 2001 has increased five times (fivefold?) in comparison with 1995. This accounts for 8.1 million m3 a year.

This can be put down to the dramatic increase in the demand for sawn logs in Scandinavia and Denmark after the abolition of the export duty on sawn logs in 1995.

The number of felled trees in state forests for the same period is about 4.8 million m3 per year. This shows the state of sustainable management of the state forests of Latvia. The decrease in the number of felled trees in the period between the year 2000 and 2001, can be explained by intensive certification activities of the State Stock Company.

Taking into account the fact that 50% of Latvian forests belong to the state and the other half is private, one can conclude that private forests are logged much more, and most of the principles of sustainable management of forests are not observed. They are also not in compliance with the requirements of FSC or Pan European Forest Certification (PEFC).

Fig.2 shows the amount of renewable State and Private forests by planting trees and natural renewal.

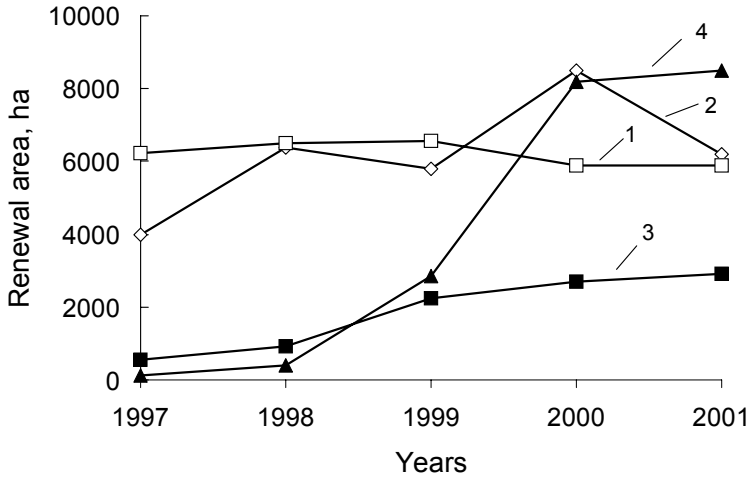

Figure 2: Amount of renewable in state and private forests
1- planted trees (state forests);
2 - natural renewal (state forests);
3- planted trees (private forests);
4 - natural renewal (private forests)

In the year 2000, the state forests renewed an area of 5900 ha using the plantation method. Private forests are renewed only an area of 2700 ha using the plantation method. The area of naturally renewed forests was similar in the year 2000. There were 8500 ha of the state forests and 8200 ha of private forests.

The renewal of forests in private sector takes place slowly. Taking into account the large amount of logging, it should be increased by at least 2.5 times yearly or by 28,000 ha of renewed forests.

4. Conclusion

1. According to the FSC, the State Stock Company, "Forests of Latvia's State", has certified 597990 ha of the forest between Spring 2001 and July 2002, 1.4 million ha belonging to the company itself.
2. The investigation shows that "Forests of Latvia's State" observes the principles of sustainable management of forests not exceeding the number of felled trees and renewal of forests goes on well. But the management of private forests is unsatisfactory.
3. As a result of the certification of state forests this year (2002) saw mills will be able to buy about 880,000 m3 of certified wood products.

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Part 9

Our New Enemy

Timi Ecimovic*

The Climate Change System[1]

Introduction

Worldwide scientific research, complex problem solving, case study research, education, and many other activities of homo sapiens and society today have to take into account the issue of the climate change system, which plays a main role regarding changes within the biosphere. This is a most dramatic issue at the end of the 20th and the beginning of the 21st century.

The Climate Change System is, for example, a provider and guardian of living conditions within the biosphere of the Earth. It plays a more important role than humans used to think. For the Earth's biosphere, it plays the important role of making, providing and guarding living conditions, to which living creatures have to adjust in order to survive. The extinction of species, smaller and larger ones alike, is due to changed environmental qualities because of changes within the climate change system.

The Earth's biosphere is made up of **interdependencies, interactions and co-operations** of matter, energy, and information within the context of time. Time is a human invention; it does not exist in nature. The interdependencies, interactions and co-operations are related to water, land and air. To be ready for changes and mitigations due to the climate change system, all of us, as individual representatives of the human race, have to learn more about the basics of the biosphere.

Risk assessment research was not well developed during the industrial revolution and recent times, and issues such as intensive agriculture, synthetic chemical production, "money democracies" (in which money governs human beings, i.e. society), corporate social responsibility, nuclear technologies have harmed natural environments for an irresponsibly long time – sea and ocean waters, land and air. Today, there is the question when, and how harmful, the impact on living creatures of the Planet Earth´s biosphere will be. Science and people´s need to understand the interdependencies, interactions and co-operations within the environment, and of all matter, energy, and information to allow for a sustainable future of our civilization.

*Up to re*cently, individuals and society have been using nature, the environment and biosphere as a commodity free of charge. But today, things are more complex regarding the quality of nature in the context of the climate change system. Major impacts of the climate change system on society, such as sudden floods, strong winds, earthquakes, tsunamis and changes within the local environment, may produce highly negative results. Our recommendation is to:

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* Ecimovic, Timi, Prof. Dr., SEM Institute for Climate Change, Korte 124, SI-6310 Izola-Isola, Slovenia, Tel ++386 5 6421 360, E-mail: (timi.ecimovic@bocosoft.com).

1 As support for understanding you may look at www.institut-climatechange.si to »Atlas« drowings.

- Apply systems thinking! Within that, the **Dialectical Systems Theory,**
  helps linking results of human work, *creativity and innovation* with holistic thinking, decision-making and actions on the micro-, meso- *and macro-level.*
- Establish a clear relationship with Nature. *That will contribute positively to the process.*

We think it is advisable to learn about the limits and possibilities of the climate change system to obtain a clear vision of changes which may affect human society, the biosphere and Planet Earth. We will concentrate on some basic features of the climate change system in order to support two suggestions:

Water, land, air or the biosphere is the basis of life on Planet Earth. Not many researchers and members of the public are familiar with interdependencies, interactions and co-operations needed for the survival of living creatures. The latest research on systems thinking and the climate change system has had an important impact on the knowledge we have of nature, so that humans can better understand their environmental effect.

From a natural point of view, the climate change system alias the climate, the climate change – is a complex entity of conditions within the living space of the biosphere. Actually, the living space is the biosphere itself, which is a tiny part of the Earth Planetary System. Watching the climate, and taking it into consideration when making decisions – these have been two very separate issues, especially in recent centuries with industrial life taking the lead and causing narrow professional specializations to reign and prevail.

There are two main sources of climate change: the natural ones and the ones caused by humans. We humans should understand both of them in order to accept the natural ones and possibly prevent their tough impact on ourselves, such as floods, droughts, air and water pollution etc. But we should better understand and cope with the tough impact of our own failures and prevent them, too.

The systems (as complex entities rather than mental pictures of them) could be formally set according to their size as follows:

- MACRO / MEGA / SUPERIOR / SENIOR / VERY BIG etc., systems such as the Universe, the biggest system known to humans, the Milky Way, the Solar System, the Planet Earth System etc., and
- MICRO / INFERIOR / JUNIOR / SUB etc. systems that are smaller and are either natural such as Homo sapiens / plant / animal / living creature/s, and or artificial / human-made systems such as a township / car / aircraft / rocket / satellite, etc.

Of course, the above artificial and natural systems create a need to distinguish between natural and social sciences, neither of which includes all human activities as an integral part of nature. We think there are no artificial and natural systems, but all of them are natural as long as they are results of living creatures' activities. But we know it may take a long time for such a philosophy to be understood. We suggest using the term artificial and natural systems for the time being.

Systems theory, systems thinking, analysis, and synthesis are the best assistants available today for humans to understand complex problems, which both the macro and micro systems are. There is no simple system, and there is no system that we may say humans know everything about. This could be stated more rightfully when one uses systems thinking, which could make the difference between the scientific thinking of today and that of tomorrow.[2]

The current understanding of climate change is limited by anthropocentric and other views. *That* would be less the case if systems theory, system thinking, analysis and synthesis were applied. They could enhance our understanding of the interdependencies, interactions, and co-operations of mono-, trans-, multi-, inter-, and supra-disciplinary issues, all of them as an integral part of the inferior and superior systems, within the system of Planet Earth. *Moreover, it would include the Solar System, the Milky Way System and the Universe/Cosmos.*

The climate change system is a macro system of Planet Earth's nature or biosphere made up of interdependencies, interactions, co-operations of superior, inferior natural systems. The climate change system responds not only to our civilization's activities, but also to rules, practices, interdependencies, interactions and co-operations of other systems in nature. If we do not understand the climate change system, it is due to improperly directed research. This has nothing to do with common humans, but with the one-sidedness of the present social order, profit-based democracies, especially in nations of the G 7 countries leading our civilization, and international as well as national bureaucracies. They lack holism and make room for the onesidedness of human actions.

Brief history of the Planet Earth as a one of Subsystems of the Universe

The planet Earth appeared around 4.5 billion years ago (4.500.000.000). At that time the planet was something like a ball of energy and gases with temperatures around 7.000 degrees Celsius. Within millions of years the planet cooled down, and firm matter was formed within two hundred million years. The oldest rocks on the Earth have been dated at 4.3 billions years ago (4.300.000.000). The planet Earth is an inferior system to the Solar System, the Milky Way, and the Universe.

The Universe is the largest, most complex of all macro systems humankind may research and explore, and it consists of all matter and all light and other forms of radiation, energy, particles, rays, powers and forces and yet unknown contents. It consists of everything that exists anywhere in space and time. The universe includes the Earth, everything on the Earth and within it, and everything in the Solar System. Our Solar System contains nine major planets along with a tenth and eleventh as newcomers to the family, and thousands of comets and minor planets called asteroids. It also contains the Sun, the star around which the planets revolve.

[2] Prof. Emeritus Dr. Matjaz Mulej from Maribor University of Slovenia has introduced The Dialectical System Theory as assistant and tool for a better understanding of complex and complicated issues, With his work he has also influenced this presentation.

If we estimate the total existing information about the Universe as 100 units that currently exist, our civilization's knowledge may be somewhere between one and two units. We have to explore and research much more than we have done so far. Of course, we must not forget the system dynamics and evolvements, which both reach beyond our present knowledge of the Universe. Understanding the holistic nature of the Universe, we have to understand that the Universe dynamics are present in countless forms, transitions, expansions, big and small bangs, appearances and disappearances, multidimensional levels, large and small dimensions, and countless other happenings or evolvements.

Second to the Universe is the Milky Way System, which is a limited part of the Universe within which we humans exist. It is our first exploration target and a system about which we have to learn as much as possible. The Milky Way consists of about 100.000 billion and more stars as systems of whatever form, and a countless number of planets, micro planets or asteroids, and all other forms of energy, light, matter, particles, rays, powers, forces and yet unknown contents of any kind.

The composition of the Earth, as a planet inside our Solar System, is "unique" because of the information, matter and energy at its birth. All forms existing at the moment of its appearance are included within our Earth System, and so are many other forms of the Universe such as light, particles, rays and matter that from the Earth's first appearance until the present have collided with it. Major influences on the Earth's dynamics come from the permanent energy flux from the Sun, and from collisions with asteroids, which arrived from outer space. It is important to have this knowledge, which may be helpful when researching and exploring the climate change system, because the first outside effect on the climate change system came from outer space in the form of asteroid and other dangerous collisions, which have been changing and may continue to change the equilibrium of Earth Planetary System as well as the climate change system.

From the past, we may learn about a number of occasions when the Earth climate change system reacted with dramatic changes in living conditions. They were recorded as Glacial or Ice periods, which were results of radical decreases in mean land and ocean temperatures. Of course, we should not forget that land mass and salt water mass react differently to the change of mean temperatures. The land mass reacts faster than the salt water mass. Consequently, life on the terrestrial part of the Earth (totalling to app. 30 % of the Earth's surface) has been affected more than marine life during ice periods.

Interdependencies, Interactions and Co-operations of Life

The climate change system is a natural complex entity or system. It consists of several subsystems and is a subsystem, itself, of systems such as Planet Earth, the Solar System, the Milky Way and the Universe/Cosmos. It is very old and has been changing all the time, offering more or less stable conditions for life forms. In the current climate change system, much more extreme changes have been taking place, over the centuries of industrialization and post-industrialization, than ever before since the end of the last ice age. We humans are not the only cause of these dangerous

processes, but an essential one in any case, especially if our decisions and actions are based on a lack of systemic/holistic thinking.

The climate change system as an integral part of the Planet Earth biosphere is located somewhere between its inferior and superior systems; all of them, including the climate change system itself, have a number of mutual interdependencies, inter actions, and co-operations.

So here we are. We have the Universe, the Milky Way, the Solar System, the Planet Earth System, and life on the surface of its terrestrial and aquatic parts as well as within its atmosphere. With the existing input/output effects from superior systems, especially the Solar System, with evolved parts of the Earth system, etc., the climate change system became the provider, upholder and guardian of living conditions within the biosphere.

The climate change system is an integral part of the Planet Earth biosphere. It has no clear-cut borders with other systems in nature, as we humans are used to thinking and seeing. The climate change system is, rather, a complex natural system. *It* actively *takes, uses and receives from inferior and superior systems. However, it also provides, inputs, influences, impacts all inferior and superior systems* and reflects the present ones as living conditions at the very moment of observation. Observers can go back in the history of evolvements, but cannot look into the future, due to countless possibilities involved in shaping it.

The difference between people's traditional thinking and system thinking could be described as follows, where the climate change system is concerned: when observers look at our civilization's achievements from the viewpoint of its building and construction heritage, it looks impressive, everything is in order, the arcs and lines are in a geometric order, and the whole construction follows a certain tradition, a certain style of architects` creative minds. *One cannot generalize that. Antonio Gaudi (1852 – 1926) is, however, regarded as one of the most original exponents of art nouveau in Europe and noted esp. for the church of the Sagrada familia, Barcelona* and other constructions. Also, our houses, exterior and interior arrangements, agricultural activities, communications, roads and railways etc., follow a certain order which does not resemble virgin nature. To us humans from this civilization, virgin nature looks like chaos, and we are not in a position to see that it sees us, as well. It is also difficult to say whether the distance between nature and the human life style is currently big or small, but it is obvious that we humans have made many different interventions and innovations which do not correspond to nature's ways. So, for conventional thinking, the chaos of nature is chaos, and our life style is not. On other hand, thinking on the basis of system theory may allow us humans to see natural chaos as order and the human order as a sort of chaos. When not only scientists, but also common people in the local communities have the ability to realize this, we shall have a much more natural habitat than we do now.

When we apply the above findings to the climate change system, we may understand "chaos" as the interdependencies/interactions/co-operations of many different systems of nature resulting from parts of the very complex climate change

system. Of course, we should not forget that this thinking is the thinking of human beings, and it has all the good and bad attributes which we humans have.

The climate change system is the result of the permanent evolution of natural systems which support the biosphere as the space for living creatures within nature. We have seen how the climate change system depends on its superior systems, and let us first list, here, the influences they may have on the biosphere.

The climate change system - maker, provider, guardian and upholder of living conditions within our biosphere - is composed of a large number of systems which interact and are interdependent/co-operative and have evolved into present conditions at the place of observation, all at same time. Thinking globally, the climate change system can be observed in patterns or expressions or variations which show up in different values of temperature, moisture, and currents.

The biosphere is composed of terrestrial, aquatic and atmospheric subsystems. Their characteristics are basically the framework within which the climate change system has the role of provider, upholder and guardian of living conditions.

Very well known geographical facts of the Earth, such as latitude, longitude, and altitude are decisive for warmth and light, reflected in the quality of the local environment. On the other hand, the distribution of this quality depends on the basic characteristics of the land or aquatic environment. Of course, when differences meet at bordering environments, their quality is more complex. And it is not so simple, when taking into account complex interdependencies/interactions/co-operations among all these different systems, to decide which of them have something to do with the climate change system.

From the selected viewpoint, the most important inferior system of our biosphere is life on Planet Earth. As soon as the primordial Earth was ready to host life, it appeared. In ocean waters, the anaerobic bacterial life was the first to influence all later evolvements. Due to the exceptional reaches of ocean waters full of inorganic compounds, the first bacterial cells had an excellent living environment. The ocean waters protected them from UV rays and the temperature of waters was suitable. The light and warmth from the Sun were at a lower radiation than today. All phases of anaerobic life lasted from its beginnings around 3.8 billions years ago until the appe arance of oxygen in the atmosphere around 2 billions years ago. Bacteria have changed the Earth's biosphere from an oxygen-free to an oxygen-rich one, from an environment unprotected against UV rays to an environment with an ozone layer as a UV protection zone. Sterile terrestrial lands changed to lands rich with life. After the change from anaerobic to aerobic life, the biosphere changed, and many complex life forms evolved. The water cycle, the oxygen cycles, the carbon dioxide cycles, the sulphur cycle, and waste of organic compounds together with life itself have been an integral part of the biosphere's environment. The basic influence was that of changing the fragile environments into life-friendly ones, which resulted in the protection of the Earth's surface against erosion and its subsequent destruction of lands, and the protection of ocean water currents and air movements established as regular or temporary. The biosphere was evolving and became the space for life and living creature. Physical, geographical, chemical, biological and systemic

interdependencies/interactions and co-operations made an environment possible that supported the evolvement of life. Today, we may find, at one and the same time, primordial conditions as well as any later developments within the Earth's biosphere. Our present biosphere has a countless number of biological subsystems along with their synergies, ensuring the continuity of life in the present and many changed environments in the future.

The Water Cycle: A Crucial Component

The water cycle makes the difference between Planet Earth and the other terrestrial planets Mars, Venus and Mercury. It is part of the biosphere and was provided at the birth of the Earth. The water cycle is a subsystem of the biosphere and provides the basis for the quantity/quality of the biosphere environment. When the Earth came into being and as soon as it had become cool enough, water appeared in liquid, ice and gas forms; the water cycle commenced its permanent action or evolvement. As an environment, it has excellent transport and interaction abilities which, along with other sub-systems (cloud formation and movement, lightning and natural electricity) probably assisted in the birth of life.

Life first appeared in an aquatic environment, and it took almost two billion years for life to move from the aquatic environment onto terrestrial lands. 97.5 % of the Earth's water is in oceans/seas, and fresh water makes up 2.5 %: 68.7 % in glaciers (which are diminishing due to the climate change system impact on main surface temperatures), underground water 30.1 %, permafrost 0.8 % (also decreasing), and surface and atmosphere waters 0.4 %. Surface and atmospheric waters are: lakes 67.4 %, top soil moisture 12.2 %, atmospheric waters 9.5 %, swamps and marshlands 8.5 %, rivers and streams 1.6 % and biota waters in living creatures 0.8 %. Water is a needed quality of the biosphere and has been a precondition for life. Most living creatures have between 75% and 95 % and more of water content within their bodies. Water is the main transport system within cells, tissues and the body itself. Water is the main environment for chemical processes in nature. Water is the main architect of nature, when carving mountains, lakes, rivers, and shaping the Earth's surface.

From the book "Slovenia Yesterday, Today and Tomorrow, Water Management Challenge to Slovenians in the Third Millennium", Ecimovic/Jan/Vrhovsek, Ljubljana, Slovenia, 1998 (in Slovene) and (please see "Atlas" at www.institut-climatechange.si).

The terrestrial, biological and atmospheric waters are less than one percent of total waters on Earth, but due to the water cycle, they are an important sub-system of the biosphere.

The Atmosphere

Between the Earth's body and outer space reaching up to 1.000 kilometres, there is a large environment of gases, rays, particles, natural powers and forces called the atmosphere. The first ten to fifteen kilometres are called the troposphere, the lower part of the atmosphere. It is the weather-impacting region where air movements are

most frequent. It is here that clouds form and move and one can find living creatures, from birds to microbial life forms. The troposphere ends where the stratosphere begins, reaching 15 – 50 kilometres from the Earth's surface, including the ozone protection band (15 – 24 kilometres). Mesosphere (50 – 85 kilometres) and Thermosphere (85 – 400 kilometres) lead to the Exosphere, which ends in outer space at an altitude of around 1000 kilometres.

The atmosphere is a gaseous cover of the Earth's surface and an integral part of the biosphere and of the whole Planet Earth System. It takes, transports, rebounds and transforms the band of the Earth for the Sun's rays of light and warmth, as well as for any rays/particles/outer space bodies/natural powers meeting the Earth as a whole.

Two main gases make up 99 % of the atmosphere: nitrogen 78 %, and oxygen 21 %. As everything in nature, their distribution, movement, and content change within limited possibilities. The remaining one percent is made up of the natural presence of carbon dioxide, methane, water vapour, nitrogen oxides, argon etc. The oxygen is present as dioxide, ozone, carbon dioxide, and water vapour. As a contribution of our civilization, additional gases have been put into the atmosphere such as: even more carbon dioxide and methane, nitrous oxide, chlorofluorocarbons CFCs, hydro fluorocarbons HFCs, perfluorinated carbons PFCs as green house gases. As photo-chemically important gases, there is carbon monoxide, oxides of nitrogen and nonmethane volatile organic compounds NMVOCs, which indirectly contribute to the greenhouse effect.

The atmosphere as the largest part of the biosphere has an important role in making life possible due to its oxygen concentration, which is the life-supporting gas amongst the atmospheric gases. Secondly, it is the area of water vapour transport and cloud formation and the main transporter of the water cycle, important from the biological point of view.

Air movement in multidimensional space has regular and irregular patterns, and during the current climate change system movement, extreme air movements have occurred. During the last 20 years, wind speeds of up to 500 + kilometres per hour have been recorded. For the biosphere, air movement is of great importance as a transporter of life forms, moisture supplier, and local weather maker. On the other hand, it is antagonistic to human constructions, which are usually demolished when strong winds/tornados/typhoons hit them and their standard of construction is inadequate.

The carbon cycle was probably the most important cycle during primordial Earth times, because it caused crust formation and carbon cycle depositions at the ocean's and sea's bottom and land surface. It is a direct in/output of biology and part of the biosphere's chemical processes.

Carbon is a constructive element of the biosphere. A very fast (less than 1 year) exchange of carbon happens within plant life. It is today the second carbon exchange which takes first place when thinking of very fast carbon exchanges. Fast (1 – 10 years) carbon exchange comes from soil and the surface of oceans and seas. Slow (10 – 100 years) is the exchange of carbon within forest systems. Very slow (more than 100 yeas) carbon exchange is important in the biosphere for the deposition of carbon

by microbial life and calcium carbonate sediments/rocks. Due to the relatively slow processes within the carbon cycle in nature and the relatively fast input of carbon into the biosphere by our civilization, we have a situation which the existing processes in the biosphere are not able to compensate. That is one of the reasons for global warming.

The sulphur cycle was a less important cycle in nature before our civilization came into existence. It has its important role within nature, but our civilization damages nature through increased quantities of sulphur (acid rain). Sulphur is an essential element for the existence of life on Earth.

Civilization as a Hampering Precondition

Whether it is an inferior or a superior system of the biosphere, Planet Earth, Solar System or Universe, our civilization is a small system, but an integral part of the whole. Today we are discussing our problems with nature, space and environmental protection (protection against whom?), but even the great Greek philosopher Plato more than 2.000 years ago stated:

"When forests were still growing in the mountains of Attica, the rich soil received water and stored it, so that the absorbed mass slowly spread from the heights, feeding fountains. But now the fatty and rich soil has been washed away and just the meagre framework of the landscape is still present – comparable to the skeleton of a body attacked by illness".

The systems have not been properly named "important and unimportant systems"; they all are systems interacting, interdependent *and* co-operating to produce the results we have in the Biosphere now. But we humans have not sufficiently followed nature's instructions to think about those interdependencies, interactions, and co-operations. *The Dialectical System Theory could be more beneficial than the General Systems Theory we have discussed in our book "System* Thinking and Climate Change System" also displayed at www.institut-climatechange.si .

The climate change system as an integral part of the Earth's Biosphere has a greater influence on our civilization than its populations think. In absolute terms, climate change as provider, upholder and guardian of living conditions makes our life possible. But we humans, in our modern relations to nature and to each other, try hard not to appreciate this fact, but to harm the climate change system as much as we can, yet fortunately not as much as we think we may have done.

There is a theory of anthropocentric interference with the climate change system, which tries to give reasons for the climate change caused by our civilization over the last 200 years, 1800 – 2000, and we would like to discuss this theory and to assess the feasibility of its translation into reality.

The philosophy about this issue was written many centuries ago when the story of David and Goliath first appeared. But by our standards, we humans do not take our David-like abilities and impacts to be general practice, and we do not know what we are, what our natural system is, which systems we are interacting, interdepending, interrelating and cooperating with, and where we belong to. What we do understand

is how to make money out of our civilization and how to use nature's wealth for this purpose. What our impacts are and what their consequences could be, most of us humans do not care about. As for our civilization's continued life on Earth, we have to recognize the biosphere's capacities if our human species is to be successful rather than harm itself. It is not only competition but also and mostly interdependencies, interactions and co-operations which provide the possibilities for our civilization to live. As long as we live in terms of the present paradigm, which can be seen as "the ostrich head", rather than take long-term responsibilities for our civilization's impact on our own biosphere, we will increase the difference/distance between the two.

It is ***not Planet Earth*** that is the home of our civilization, but ***the biosphere***, which is a tiny part of the Planet Earth system. The vulnerability of either is two separate issues that cannot be compared.

What is the present status of our civilization, do we see our civilization holistically – as a system, and what are interdependencies and interactions and co-operations needed for a sustainable future of our civilization - these are the issues of "to be or not to be" and of greatest importance for our civilization's well being.

If we accept that the origin of our ancestor, the Homo sapiens, was dated some 100.000 years ago and her first settlements some 14.000 years ago (the first settlements in Eurasia), and great cultures (China, India, Mesopotamia, Egypt, Persia) 7.000 – 3.000 years ago, we may discuss ***from where*** we are. But ***what*** we are, from the point of view of the natural sciences - biology of the biosphere and Planet Earth - this issue is not included in any of the old scripts or our predecessors' philosophies. Religions - the permanent supporters of our civilization - are our predecessors' innovations, but they have never discussed the origin of civilization. Their focus has always been on human beings and how to take from people as much as possible. Existence, economics, and ideology have always been interdependent. Warriors, kings, rulers, democrats from the past (such as the ancient Greeks some 2.500 years ago) and present religious/spiritual leaders, politicians and many others, self-appointed, elected or appointed, were products of their time and ruled as they ruled. The tribal stories – about and by people, chiefs, and spiritual leaders – describe what we are, but do not discuss what we do for our living and what our civilization's impact on the biosphere amounts to.

If we accept that we humans are an integral part of the planet Earth biosphere - nature, and the peak of the life tree on Planet Earth from the natural sciences point of view - and take system theory as our thinking tool, we may say that we belong to the plane Earth biosphere as interdependent living creatures. Thus, our civilization is ***one of the many life systems*** within the planet Earth´s biosphere and we may say that we are one of Planet Earth's civilizations. And which are the other civilizations? From our research, we may point to many living creatures and large civilizations which out-number Homo sapiens many times. Among the largest populations are microbial species, etc. It is well-known that survival depends on the availability of food, water, air and space, but what has never been considered is the impact of the species on food/water/air/space availability. In nature, many species are known which have a short lifetime as individuals/individual representatives of their species, but as species

they have been within the biosphere for a very long time. The classical case is microbial cultures – parasites that destroy their host and themselves, not as species, but as a present culture invading the host. This is a life story, one among many others. And nature has taken care of matter transition within the kingdom of life. It is a permanent system of matter transition from "ashes to ashes", not used to rule humans, but symbolizing the cycling of matter within the biology of the biosphere.

Let us see ourselves in this context. First, in scattered settlements, food, water, air and space were abundant, and settlements flourished. When settlements had joined, cultures nations were established. And as long as food, water, air and space continued to be abundant, culture was in good shape, but when food, water, air or space became scarce, the culture collapsed. So finally, our civilization became the global ruler of Planet Earth. After a few millennia, food was still abundant (in the 1960's), and water was abundant (in the 1960's), and air is abundant (at the beginning of the third millennium), and space looks like being abundant. But at the end of the second millennium, food was no longer abundant, water was no longer abundant, air was no longer abundant, and only space still looked like being abundant, which in fact it is not any more either. Is the end of our civilization approaching?

From the natural sciences point of view: yes, it is. But any culture in the biology of the biosphere has its time of birth, childhood, adulthood, old age and history.

Human Capacity of Requisite Holism – a Crucial Precondition of a Benevolent Climate Change System Process still to be attained

The novelty to be attained – and to be made an innovation – could be the ability of the current Homo Sapiens to think, understand and learn how to manage the affairs of our own civilization decently, e.g. to provide food, water, air and space for all living humans. This task can be achieved more efficiently if systems thinking is used.

The climate change system is an integral part of the Earth's biosphere, and it has the multicomplex purpose of putting together, upholding and guarding basic conditions of life: temperature, water cycle, air-sea-ocean movements, protection, management and regulation/control of the biology of the biosphere.

The climate change system is one of sub-systems of the biosphere. Which parts of the biosphere system could be affected by impacts of our civilization is a question which we shall try to give an answer to below.

The climate change system operates under preconditions given by the dynamic evolvement of physics, geography and biology of the Earth and its environment. Humans, with their practice over the last 300 years of industrial and post-industrial civilization, have been proving their ability to influence constructively and destructively their natural environment, and are going beyond the borderline of sustainable life and its long-term influence on the biosphere of Planet Earth. Our findings, revealed in our book "System Thinking and Climate Change System", demonstrate that, so far, the human impacts on the planet Earth's biosphere system have been both individual and organizational, and their consequences are individual, local, organizational, regional, national, international, continental, global and perhaps

even universal. Therefore the problem is how to attain a better and more systemic long-term responsibility of humans. The selected viewpoint considers the potential political measures that could be taken to promote this responsibility.

The climate change system as an integral part of the Earth biosphere is not its creator, but its provider, upholder and guardian of living conditions. Humans have to find a new path towards sustainability or a sustainable future, which will encourage mutual relationships of this civilization and the planet Earth in newly evolved conditions.

Knowledge, sciences, research and applied research, society and all governing, economic, national, international institutions/subjects etc. need to accept a broader view of the given evolvements in our biosphere, and to respond adequately to new challenges.

We, the people of the Earth, have to recognize the need for action towards the establishment of a world constitution, a world parliament and a world government as a possibility for our survival, with the responsibility to co-ordinate social issues and to harmonize the needs of humanity as a whole, as well as nature, space, and environmental capabilities, needs and possibilities.

Co-ordination of important issues concerning the Earth/Biosphere by a united single government could be an answer, provide practical applications of research and face the need for correct relationships between our civilization and the Biosphere. At least, we might achieve the proper management of important issues with more or less good possibilities of success. Global democracy (but not "money democracy") for a sustainable future or harmony of our civilization with nature, as well as global governance, could be the proper recommendation.

Some of the present practices on the Earth are:

- The destruction of nearly all waters with synthetic chemicals, bio and air (rain-induced) pollution,
- The destruction of air by land, sea and air traffic,
- Destruction as a result of war actions, nuclear pollution etc.,
- The destruction of the ozone layer,
- Destruction of soil fertility through agricultural practices, including erosion and desertification,
- Global warming, and, of course,
- The explosive reproduction of humankind.

Such practices cannot be dealt with by simply taking national interests into account and dealing with them in mutual isolation. They should be a major responsibility of the world government.

The climate change system, which is provider, upholder and guardian of the living conditions within the biosphere, needs special scientific research and world government action. Nature, space, and environmental protection, which should take care of the biosphere, need special scientific research done by members of our civilization and world government action, too. Both groups of topics relate to global

systems and react to human one-sidedness which causes global entropy tendencies and requires a global level of requisite holism for humankind to deal with them.

The necessary scientific and applied research to cope with the above issues cannot be provided on the basis of our civilization's current scientific and research capacities, because our scientists are more involved with armaments/war efficiency developments, and our political leaders and national, international and global bureaucracies follow their own agendas. Therefore, a new approach is needed for a redirection of scientific work towards the knowledge and values needed and capable of saving nature, science and the environment including the climate change system.

World Revolution as a Paradigm Shift from Fragmentation to Unity-in-Diversity[3]

Today, it is becoming apparent to millions of people that non-violent world revolution is our only option and that world law is the only practical route to take. It does not matter whether one focuses on environmental issues, human rights issues, health care issues, worker safety or exploitation issues, poverty issues, democracy issues, civil liberties and freedom issues, or any number of other issues facing our world – the conclusion is the same. There will be no positive solution to any of these issues without world revolution.

World revolution is defined as a new order established on principles that eliminate the present system of domination, exploitation and destruction of people and nature on Earth and establish the just rule of democratically legislated law for our planet. We need a new order whose premises are justice, sustainability, equity, freedom and universal prosperity. We will see that this is not a "utopian dream" but very possible, even necessary.

The on-going destruction of the global environment, rapidly diminishing agricultural lands, fresh water and ocean fisheries, the assumption of ever-greater wealth and power by the few at the expense of the many, the unspeakable poverty and misery that a large portion of humanity must endure for their entire lives, the destruction of human liberty, human rights, and human dignity everywhere on Earth, the continued development and manufacture of weapons, and the use of war as an instrument of foreign policy as well as U.N. policy – all of these facts about our world lead to the conclusion that world revolution is our only option.

These deeply interrelated crises are not accidents of history. They are products of the dominant institutions of our modern world that evolved five or six centuries ago and are singularly unsuited for planetary protection of human life and the environment in the 20th and 21st centuries. Thousands of books have exposed the fatal flaws in these institutions, yet the dominant powers and dominant media use every resource at their command to prevent an understanding of these institutions and their development for the benefit of the people of Planet Earth. The dominant

[3] From the book »Our Common Enemy (The Climate Change System Threat)« A part of it is contributed by Prof. Dr. Glen T. Martin. The book is displayed at www.institut-climatechange.si

institutions of our world are global monopoly capitalism integrated with the system of "sovereign" nation-states.

The origins of these institutions can be traced to the birth of the modern world during the Renaissance and, along with the rise of science and the scientific method, define the character of "modernity." When these institutions were born, much of our planet was still unknown. People living on one continent did not know about those living on other continents. Nature seemed to be an infinite and inexhaustible resource, there for the taking and exploiting. Exploitative capitalism and the early "sovereign" nation-state seemed institutions that could produce wealth for many and glory and security for nations. It did not seem to matter that the world was divided into thousands of competitive corporate and national units, all operating out of self-interest without any concern for nature or people.

The fragmentation of these early modern institutions was not questioned, because the world itself was not understood as a single unit. There was little conception of a single human race trying to become successfully interdependent on a tiny Earth biosphere or "spaceship Earth." There was little or no conception of a planetary environment integrated into a single ecosystem that could be fatally disrupted by human activity (Harris, 2000).

Today, despite the best efforts of the corporately-owned dominant media to prevent understanding, and despite the immense propaganda spewed forth by imperial governments, more and more people worldwide are realizing that the world has no future under these institutions. For the global crisis that we face is precisely the product of these institutions, forms of organization five centuries old, that were never intended to regulate the whole of our tiny, planetary ecosystem or to integrate and harmonize the vast multiplicity of the Earth's people.

If we are to survive on this planet much longer, if we are to eliminate the nightmare conditions in which a large portion of the Earth's population are forced to live out their lives, if we are to preserve the collapsing planetary ecosystem, if we are to abolish militarism and war as instruments of nation-states, we need new institutions designed for the world as we face it today: a fragile, integrated, interdependent whole.

This means planetary revolution. It means founding human civilization and our relationship with the global environment on new, planetary institutions. The old systems of fragmentation have taught us much that is useful. In the political sphere, they have taught us about democracy, human rights, multi-cultural respect for one another, and the need for freedom, justice and the basic equality of all.

The Twisted Logic of the Nation-State System

As **Errol E. Harris points out in his essay "Are We Untouchable?"** below, the United Nations cannot prevent this, because Article 2 of its Charter commits it to uphold the sovereign status of its members, and Chapter VII provides, as its means of "peace-keeping," only warlike measures "by land, sea, and air." Accordingly, as long

as states remain sovereign and independent, world peace cannot be maintained and neither can the legitimacy of nation states. The U.N. is premised on the same flawed logic of nation states that belie the noble ideals enshrined in its Charter.

As long as the "territorial instinct" is exacerbated by dividing the world into nearly two hundred autonomous units, as if the Earth could be the "private property" of the people who happen to be born at a particular place, there will be the danger of obsessive nationalism and fascism. Any honest history course covering the modern period will reveal the havoc this territoriality has created with the values of democracy, freedom, justice, and peace. Only a united world, premised on the principle of unity-in-diversity can overcome this ever-present consequence of the logic of nation-states.

Democracy can only be world democracy. The twisted logic of the "sovereign" nation-state system gives us the world described above of militarism, corporate manipulation of governments, the ever-present threat of fascism, systematic media distortion of information and imperialism. Under these conditions, authentic democracy within nations is nearly impossible. Decisions and conditions from outside the nation impact individual nations in ways beyond the control of citizens. Governments necessarily have to keep their foreign and military policies secret from their own citizens, defeating civilian oversight of government which is the essence of democracy. Economic and other decisions within the nation necessarily impact people in other countries. Citizens' control of their lives (democracy) becomes a utopia.

The only real freedom must be world freedom, guaranteed to every citizen on Earth. Freedom is impossible under this current world-system. Governments routinely restrict freedom because of the uncertainties created by the chaos of nation-states. They maintain elaborate immigration protection systems, elaborate systems of visa restrictions and elaborate security arrangements because of the threat of terrorism, subversion or machinations of other nation states. None of this would be necessary in a world where gross injustices have been eliminated and every nation and person has equal rights to participate in government. Only democratic world government can secure real freedom for the peoples of Earth.

Justice can only be world justice. As long as some nations have substantially more wealth, power, and influence than others, there will never be a just world order. The logic of nation states, we have seen, ensures that there will never be economic, environmental, juridical, or democratic justice among the diverse peoples of Earth. Only a world government under the *Earth Constitution,* with the clear mandate to treat all people equally and to create a just world order, can succeed in this task.

Finally, peace can only come to humanity as world peace. All of the consequences of the logic of the nation-state system work to destroy the possibility of peace in the world.

Militarism, unregulated corporate power, the tendency toward fascism and blind patriotism, the distortion of news and the media and imperialism all work to destroy the possibility of peace. War is a criminal activity. The production of weapons of war is a criminal activity. Only when these activities are recognized for what they are and

abolished by enforceable world law will there be peace on the Earth. Only when substantial justice has been created for the peoples of Earth will there be peace. No force on Earth can create world peace except democratic world government.

Throughout the history of nation-states in the modern period of the past 500 years, one or more of these logical consequences of the nation-state system have coalesced to perpetually destroy democracy, freedom, justice, and peace in our world. This history is there for all to see. Today, with the technology of weapons of mass destruction brought nearly to perfection, this system portends the self-destruction of the Earth and our common human project. Today, all five of these negative consequences of the nation-state system have coalesced in the global empire of the United States.

Examples on Climate Change

The following two examples on climate change are small islands. One is in the Arctis and the other one in the Pacific. They illustrate the effects of the climate change system on people, settlements and ecology. Hopefully, these examples will motivate readers to reflect the more abstract presentation of the climate change system and the related need to develop a world government to master the problem.

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Melanie Thun*

„Shishmaref Must Yield“

Shishmaref

It is literally a location at the end of the world. Shishmaref – a small village on a five-kilometer-long and only 500-meter-wide and constantly narrowing sandbank off the coast of Alaska. At some point in time, this place will no longer exist. It is doomed. And it is global warming that bears the blame.

Just over 600 people live here – most of them natives. The Inupiaqs, who belong to the tribe of the Inuit, lead a thoroughly traditional way of life. Their homes have no running water. In the summer, they collect rainwater, and in the winter, they melt the snow. They are hunters and gatherers like their ancestors were, who lived on this island as long as 4000 years ago. For centuries, they have been self-supporters, living on polar bears, walruses, seals and caribou, on fishing and gathering wild fruits.

As does Tony Weyiouanna. With his family, he drives to their camp, from where they go hunting and gathering berries.

He was born in Shishmaref and grew up there. He worries about the climate change, as do all the other inhabitants.

“In the cold months, the ice is no longer as thick as it used to be in my childhood. When I reached the age where you start hunting, I could walk out on the ice as far as 50 kilometers during springtime to shoot seals. We can’t do this any longer, because the water doesn’t freeze for more than 10 kilometers away from the coast. It has changed our ways of hunting. We can’t just go where the animals are any more.”

Threatening storms

With his camera, he has filmed the storms that threaten his native village. The ocean has destroyed many people’s homes.

Everything here is built on sand. That would not be a problem if the permafrost had not begun to thaw. It was a gelid glue that held the sand together. Pack ice used to protect the island, as well, against lashing storms. Today, the softened ground is hit by waves with nothing there to absorb the blow. Since 2001, the coastline has thus receded by nearly eight metres a year.

Consequently, Alaska is a place where global warming can be observed more clearly than elsewhere. In the last 50 years, the average temperature in this US state has risen by 2^{o}C, and even by 3.5^{o}C in the winter. Currently, another 100 communities in Alaska are endangered by erosion and flooding.

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* Melanie Thun, Sendung „W wie Wissen“ am 18.11.2007, ARD Filmbeitrag: „Shishmaref muss weichen“ **For the permission to publish the papers on “Shishmaref” we want to express our gratitude to Melanie Thun.**

Climate change as a topic for classroom teaching

That is one reason why climate change has found its way into Shishmaref's classrooms.

Ken Stenek is the geography teacher at this school. He does not believe that students are ever too young to understand climate change.

He has been living on the island for nearly ten years.- together with his wife, a native, and their four children. He is familiar with people's traditions here.

For instance, they never needed a refrigerator for the supplies of meat and fish they caught in the winter. They just buried them in the cold ground. But with meat now being not as well cooled, there is a real threat of poisoning. Some people have already died.

A stone wall

Stanley Tocktoo is the mayor of Shishmaref. He was born here 46 years ago. At that time, there was no stone wall to protect the island from further erosion. Several million US dollars have been invested since in this preventive measure.

"If we hadn't built this stone wall and had continued to do nothing, we would have lost land simply through floods. The flood tide just move in close to the ground, causes the permafrost to melt and sucks away the land. We have problems with erosion, not only with storms."

Uncertain future

So what is going to happen to Shishmaref and its inhabitants, whose land is slowly being snatched away from under their feet by the sea because of climate change? Will the numerous children be able to live in the traditional ways their parents still do now?

The community has decided to leave the island.

For one thing is obvious: Shishmaref will disappear. Its inhabitants will have to give it up and relocate. Their destination is Tin Creek, a hill on the mainland, 18 kilometers away. All that exists there is tundra, as far as the eyes can see.

The greatest problem: moving there will cost 180 million dollars. A lot of money that the American government has not been willing to pay so far. Tony Weyiouanna is scared of the future: "If we are forced to move to another community or city, we will lose our cultural identity. We are proud of our origin and traditions, and we want to keep them up."

Thus, the fate of Shishmaref is still unclear. A small village in faraway Alaska as a prime example. For one day, many cities along the coast may face the same dilemma.

Werner Zeppenfeld*

Tuvalu: An Island Nation Cables SOS

Tuvalu is halfway between Hawaii and Australia. It consists of nine coral atolls in an area of 26 square kilometres.

Life in this part of the Southern Seas is very tranquil. No other country is further away from the rest of the world.. And tourists rarely stray here.

Just under 12, 000 people live in Tuvalu, most of them on the main island of Funafuti. There are no riches here, but enough food for everybody. Relatives send money from abroad, the island itself is a tropical garden, and the ocean all around is inexhaustible.

It is paradise for the inhabitants, but they have a big problem: the danger of flooding. They measure painstakingly here how the ocean waters have been warming up and rising for years. The future of an island where the highest peak is three metres above sea level can be a matter of centimetres. “We send our water levels in minute intervals to be analysed at the University of Adelaide in Australia”, says Tauala Katea, Tuvalu’s climate researcher. “From long-term test series, we can read that, on average, the sea level rises five to six millimetres a year.”

In 25 years, the islands might be uninhabitable, and in 50 years they may have disappeared altogether, if storm tides don’t bring about their destruction even sooner. For the generation growing up now, the government is already trying to implement the status of environmental refugees. It is mainly New Zealand that eventually wants to accommodate a part of the population. But that is a rather dismal perspective for most of the inhabitants of the palm tree islands in the greenish-blue ocean.

Sea water is seeping through the island ground everywhere. The potable ground water has become too salty, crop production is suffering, more and more food has to be imported. The Prime Minister of Tuvalu is appealing to the world community.

“I ask all countries”, says Apisai Ielemia, “to join the treaty on climate protection.Please save our future for the sake of humanity. Aren’t we all God’s creatures? We all have the right to live on our patch of ground. And not to be swallowed by the sea.”

The inhabitants love their islands and do not want to give up their roots and traditions. They know, however, that theirs is a paradise on call. Out there, day and night, the sea around Tuvalu is rising, quietly, almost imperceptibly.

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* Dr. Werner Zeppenfeld, WDR Weltweit (Westdeutscher Rundfunk Weltweit): **For the permission to publish the papers on “Tuvalu” we want to express our gratitude to Dr. Werner Zeppenfeld.**

Part 10

Possible Follow up Studies

Rainer Fuchs*, Shalini Misra**

Need and Possibility for Analysing Human Motivation Potential – Related to Sustainability

1. Introduction

The World Commission on Environment and Development defined sustainable development in 1987 (see Brundtland Report). Sustainable Development meets the needs of the present generation, including the conditions of healthy reproduction, without restricting the ability of future generations. Because of the interconnectedness of the social, economic and ecological problems, all three should be managed as one network. (Jenny Goldie et al, 2005).

A remark on defining sustainability: Alan Fricker … quotes a definition by Veiderman when he says: 'Veiderman may have come closest to a definition of Sustainable Development or shortly Sustainability: Sustainability is a vision of the future that provides us with a road map. It helps us focus our attention on a set of values and ethical and moral principles. They should guide our actions.' (Alan Fricker, in Nolberto Munier, 2005).

Since the Earth Summit of 1992 the member countries of the OECD have been intensifying their support to promote the global economic development, under the condition that it is socially and ecologically (environmentally) acceptable. That leads to the question how sustainable are our innovations, not only in the technical production, but also in the human social systems. It refers to a value system as emphasized by Veiderman, sustainability helps us focus our attention on a set of values and ethical and moral principles which should guide our actions.

What should be done to bridge the gap between the sum of progress (innovations) achieved so far and the degree of sustainability, regionally and world wide? How should one gear the growth in global population, the protection of the nature against the dangers of economic activity and food production? Part of the effects of the progress are the big threats to mankind. One of these threats and enemies is climate change, which is caused, for example by industries and modern traffic.

Further issues are: Loss of species (shrinking biodiversity), decrease of non-renewable resources such as fuels and inequalities in its distribution, pollution of water. Other negative effects are the decrease of human health and well-being, human terror and war, reduction of unemployment through automation.

The 'hidden costs', which often were not part of the cost/benefit considerations during previous periods, have been increasingly integrated into the costs of projects,

* Prof. Dr. Rainer Fuchs (Emeritus TUM), Feldafinger Straße 15 a, D-82343 Pöcking, Tel 0049-(0)8157-8627.

** Shalini Misra, M.S.,PhD Candidate, Department of Planning Policy and Design, School of Social Ecology, University of California Irvine, Email: shalinim@uci.edu
Phone: 949-228-3673

costs of organisations and the costs of the society more recently, for example fuel consumption due to unsatisfactory insulation of walls, windows and doors, etc.

Rene Jorna hypothesized that the non-sustainable organisations around the world prevent people from l e a r n i n g e f f e c t i v e l y how to operate in sustainable ways (Rene Jorna, 2006). Therefore it requires a variety of educational activities, especially teaching. We mean teaching according to the aim to stimulate behaviour in favour of sustainability. The development and approval of adequate teaching units requires to test the outcome not only in terms of knowledge and understanding, but also in terms of attitudes, interest and motivation in favour of Sustainability.

As an example of this kind of testing of the motivational outcome in the process, we may mention an investigation concerning the efficiency of the Case Study Method according to cases in agribusiness. The testing procedure was based on the comparison of results from a lecture group and from a Case Study Group. Both groups were equal in knowledge and understanding, but the members of the Case Study Group were superior in achievement motivation concerning agribusiness, in application of theories and concepts to solving agribusiness problems.

The testing procedure was based on a comparison of a group adequately thought by the Lecture Method with a group thought by the Case Study Method. The motivation is measured through qualitative and quantitative analysis of imaginative stories. The stories were written by the participants of the test. All were free to compose the content of those stories. The scientific background of the diagnosis of the imaginative stories tells us: The authors of the stories have been storing their knowledge and experience as well as their emotions in their memories from which they wrote the contents down in the test.

2. Basic Aspects of Diagnostics Related to Motivation and Education Towards Sustainability

The theory of achievement motivation, its establishment according to learning rules, its activation depending on associations and its adaptation to reality through the experience of success or failure in motivated actions is assumed to be valid on the basis of experimental results. Thus the sustainability-imaginative stories, which will be explained later, do not have the significance of substantiating an inductive theory, but serve to show the manner in which the structured rules of motivated learning and acting are put in concrete terms. To the extent that the stories are useful for this purpose, that is an important sign of their diagnostic construct validity (Fuchs, 2004).

In this paper, such a test with instructions concerning the action field of Sustainability will be introduced, developed and approved. The test should help to answer the following questions: Which motivating expectations stimulate children, youth and adolescence to participate in actions referring to the wide field of sustainability? Which experiences function as a source of motivating expectations? Can sustainability activities be stimulated in which social recognition plays no part, but their significance in terms of self-esteem sets the standard?

From these overarching questions emerge the following sub-questions concerning the diagnosis:

a) Does the sustainability behaviour demonstrated in the sustainability-thematic stories correspond to the learning rules of motivational development and the rules by which associatively dependent, motivation is reactivated, as well as their effects on the organization action?
b) To what extent is the sustainability-related achievement motive organized in an instrumental way (achievement as a means to an end), i.e. to what extent is the valence of successful achievement as well as the (negative) valence of failure determined by an instrumental achievement motive?
c) Does a non-instrumental achievement motive exist at all, with success being aspired to for its own sake, i.e. for the sake of its significance in promoting self-esteem, and if so, how does such a motive show in imagined stories about Sustainability?
d) What importance does the experience of success and failure have for the development of the achievement motive with regard to the two components of aspiring to success and averting failure?

3. On the Test

3.1 Test Instructions

We were already preoccupied with these questions in previously published imaginations or stories developed in tests on sports topics and mathematics. Now we focus on sustainability. On the basis of a person´s picture (man or woman), students can invent a story related to sustainability about the person they identified with (in terms of gender and age) and describe him / her and how he or she thinks, feels and acts in the test paper.

The focus is on the picture of a person who, as we assume, faces a complex sustainability problem or conflict. Students are free to invent a story about this situation. They are to write down the ideas they come up with concerning the problem and how the portrayed person deals with it. The test instructions were phrased as follows:

A Person Confronted with a Problem

Here we have a picture of a person whose facial expression could be interpreted in different ways. The picture does not offer many clues as to what is going on in this mind. Let us assume that he / she is confronted with a complex problem of great importance to him / her. Invent and write a story outlining such a complex problem and how the person seeks to come to grips with it. Bear the following points in mind:

a) This person is confronted with an unsolved task, which according to his/her understanding is essential for the future living conditions of plants, animals or men.
b) You should put yourself in his / her situation.
c) Be sure to outline what the person feels and thinks. Which measures does the person undertake and which results will he / she achieve?

In writing the story, follow your own impulses **spontaneously.** Do not devote undue attention to style or spelling. This is **not** a rigorous scientific exercise! Go where your interests prompt you. The story, however, should reflect a **genuine real-life complex problem**.

You may take up to **30 minutes** to write your story.

In slightly different words, we want to complement the above remarks: We are assuming that the person in the picture faces a complex problem. A story is to be invented in this context. There is free choice. What is important is that students put themselves in the imagined situation of the person they selected, think out what that person feels and wants, really does and, ultimately, achieves.

3.2 Test Result (Pilot Study)

First Example of an Imaginative Story Written by a Student

Patrick Robertson works for an organisation that aims to improve living conditions in slums and squatter settlements in the less developed countries of the world. In one such Indian city, the organisation surveys a large slum settlement in the heart of the city and discovers that it is located in a 'low lying' area of the city. This was the reason why rain water would collect here from large pools of water, stagnate and cause diseases and morbidity. The slum people were not provided with drainage and sewage facilities by the municipality. Since the slum was in the heart of the city which was the hub of all economic activity, it was difficult to obtain permission from state authorities to disrupt traffic and commerce to set up an underground sewage system for the slum connecting it to the main lines. This would also cost the organisation a fat sum of money.

Mr. Robertson was contemplating to rehabilitate the slum dwellers in other areas of the city by providing them housing and other basic amenities. But the slum dwellers opposed this vehemently. They did not want to be uprooted from their surroundings and taken far away from their sources of livelihood. Some of these slum dwellers worked as servants for the affluent people nearby. Some of them were labourers in the textile and chemical mills adjacent to the slums and some of them were washermen and women who earned a living by washing clothes on the banks of the river that flowed across the slums.

Mr. Robertson felt deeply for the sentiments of the people. He did not want to break up the social fabric of the squatter settlements. Many of these people had been friends for years. Moreover, these people followed diverse religions. Even if they were to be relocated, how would the distribution be? He also felt that taking them away from their livelihood would only create more social problems and crime. Mr. Robertson had to mobilise resources, find the funds, seek permission from the state authorities if they truly wanted to give better lives to these people.

Mr. Robertson was determined. He got the slum dwellers together and prepared a public petition which sought permission from the municipality to interrupt traffic for 20 nights on the city´s main road. Then he developed a plan by which slum dwellers would pay a nominal amount of money in return for the individual bathrooms and drainage facilities they were to receive. This money would be collected in a 'fund' and the slum dwellers would be paid an interest on it when the project was that they had an incentive in the project. They would not be uprooted, they would be close to their places of work and with their friends. They would also have cleaner and more hygienic surroundings.

This way, Patrick Robertson achieved his objective of not only improving living conditions of people, but contributing to maintaining and developing a balanced social fabric.

Comments on the First Imaginative Story

The 'story' was written without any preparation by a graduate student attending an International Master Programme on "Sustainable Resource Management" at a German University. International and German students are prepared for professional work in the various fields of resource management. Graduates learn important concepts and techniques with regard to sustainable management and they acquire special management skills. The program addresses the full spectrum of sustainable resource management, from human resources to landscape planning and including plant, water, and wildlife resources. It takes students well beyond the boundaries of traditional disciplines such as forestry and agriculture. One can learn what the person undertaking the test knows about how to process work and solve such a task. Interesting is the way the complex social and technical problem is handled. Along with the intellectual aspects, motivational and emotional aspects play an important role in that system. The story is a description of a complex task including the work of the manager. The work is important for the future. The story provides insight into the awareness of the test person (author) and his/her interest in the matter. The test person shows, for example, that with money the interest of the slum people can be stimulated. Subjective qualitative aspects of that complex task are of high relevance in this context, not scientific ones. The story is about the expectations of the test person. The purpose, however, is not for the test person to read from the face of the person in the picture.

Second Example of an Imaginative Story Written by a Student

The lady in the picture seems sad and worried. She has come to a point in life, where she does not know what to do anymore. She has taken many wrong decisions, she

became a mother at the age of sixteen, consequently had to marry the father of the child, whom she did not really know up to the point when she went to bed with him. For the last eighteen years, she has taken care of her child, has devoted her life to her daughter whom she loves with all her heart.

Today her daughter has moved out to seek her own life. She moved in with her boyfriend, wants to see the world and follow her own interests. She does not really have time to spend with her mother anymore, although she loves her very much.

Now the mother feels alone. Even though she lives with her husband, she feels desolated. They do not have anything in common anymore,or rather, they never really had anything in common. Whatever he does irritates her, the way he eats, slurps his soup, the way he looks at her when coming into the room…. Yet, they have spent so much time together, they have built their life together, everything they have, starting with her daughter, the most precious thing she has on earth….

Should she leave everything behind? Forget about everything, about the comfortable little world she has built herself and take up the dream of travelling around the world, becoming a psychologist and helping other people to cope with life? But she is too old for starting all over again, or maybe not? There are many stories of people who started studying in later years and yet have become masters in their fields…

She has been thinking about changing her life radically, but now that her daughter has left, there seems to be no excuse anymore. The feelings inside, her subconscious see to get stronger and stronger, there seems to be nothing to stop her anymore. Without hesitating, she takes two bags, fits all her clothes in them and takes the next bus to the airport. Once there, she takes a look at the last minute flights, and there she sees it, a ticket she can afford to South Africa, her new home.

Comments on the Second Imaginative Story

The author of the imaginative story is also a graduate student in the International Master Programme on “Sustainable Resource Management” in Germany. She identifies with the person in the picture. The content of her story is, however, fairly different from the first one. Some readers may ask whether the story still has anything to do with Sustainability. The main areas of responsibility in Sustainable Development = Sustainability are economic, social and ecological (environmental protection). The complex tasks and problems of the three areas mentioned should, if possible, not be dealt with separately, but holistically. This means that solutions to problems in the economic field should not be dealt with unless the social and ecological fields (environmental protection) are considered as well. In this context, the family is of great significance. It is known to be the smallest entity within societies. A well-functioning family, or one with difficulties, are tremendously important for Sustainability. That is why the events outlined in the second Imaginative Story are quite relevant. However, when a large majority of male and female students in a Master Program focus on partner problems (love, commitment, divorce) in their imaginative stories, then we can see how far removed they are intellectually (cognitively), emotionally and in terms of their motivation from those

tasks and problems that were described positively in the first imaginative story in such an impressive manner.

3.3 On the qualitative evaluation of sustainability-oriented stories

With our short comments on the first and second imaginative story, we have already begun the qualitative evaluation of the stories. It appears to be an advantage to analyze the imaginative stories on a solid theoretical basis, i.e. on the basis of laws as established in motivational and action psychology. We are concerned with the following aspects:

a) Does the identification figure (IF) take on a task in the area of sustainability?
b) If so, does the IF strive for sustainability-oriented success as a means to an end, or does he/she do so mainly to confirm the value of his/her own sustainability action competence?
c) What does the IF do to achieve his/her sustainability-oriented goal?
d) How does the IF attempt to prevent failure and avoid mistakes?
e) How does the IF tackle external and mental obstacles?
f) How does the IF react emotionally to success and failure?

In addition, it should be pointed out that the sustainability thematic procedure we want to develop and test on a scientific basis should not be mixed up with the 'thematic apperception test (TAT)'. In a TAT, the arousal of the motivational potential of a student is caused through a picture. In the test with the imaginative stories, the writer of such a story identifies, however, with the person in the picture. The purpose of the picture is to get the author of the imaginative story to identify with a male or female person he/she can choose during the test. The picture should show a person of the same age as the test person. It should be without any mimic expression, not to prejudice the topic.

Every imaginative story is an individual case. It shows one's personal examination of a sustainability task. The imaginative story can serve as the presentation of a certain way of dealing with a task. Preconditions are that:

a) the task is true-to-life and authentic,
b) events and their imaginative reporting correspond to the generally valid laws of how motivation is organized and activated,
c) the task corresponds to its activation-dependent, imaginative reproduction.

The story would thus be suitable to illustrate those general laws and to fulfil the criteria of construct validity. Hence, stories serve to demonstrate and illustrate those general laws. However, the authenticity and diagnostic validity of the stories must be ensured.

3.4 Diagnostic validity of imaginative stories as well as their authenticity in the sense of being true-to-life

The assumption that test persons have portrayed their own, emotionally significant experiences seems acceptable for the following reasons:

a) The law of reverting to one's own, emotionally significant experiences: When inventing their stories, test persons must, according to our test instructions, revert to personal experiences that come to mind with regard to the given topic (of sustainability) They were always facts stored way in people's memories and could be called up by means of stimulating motivation emotionally, so that the imaginative stories could be written. They are diagnostically usable (Fuchs 1994 and 1995).

b) Coherence in terms of motivation and action psychology as well as sustainability: The stories correspond to the sociocultural background of the sustainability field. Above all, they are coherent in terms of the psychology of motivation and personality. That is an important argument in favor of their authenticity. We will refrain from giving clarifying examples in this context.

c) Correspondence to the law of stimulating the imagination emotionally: An important argument in favor of the authenticity of imaginative stories results from the fact that their content corresponds to the laws of stimulating emotions that motivate in a powerful way and their influence on a correspondingly topic-specific imagination.

d) Fact is that when test persons are put in a sustainability task situation, corresponding general and/or individual experiences are stimulated emotionally and cognitively. We find confirmed that the invention of imaginative stories is indeed influenced by emotions, so that they, the stories, reproduce contents of the motivation potential due to their storage in people's memories as briefly described. They are thus diagnostically usable (Fuchs 1994 and 1995).

e) The volitional function element: it has been missing in the function analysis given so far. What is meant by volitional function element is the intention to invent a sustainability story true-to-life, as instructed. Therefore, in the following, the function analysis described above will be dealt with again including, however, the volitional function for inventing and writing a sustainability story.

Imagination prompts a sub-system integrated into the complex of sustainability motivation potential and emotionally driven. This occurs according to the experimentally proven laws of imagination under the influence of emotions. Thus, the relevant experiences, motives and action patterns, deliberately stored, can be called up to invent a sustainability story as intended.

In addition, the validity of the procedure is substantiated in this way. This occurs on the basis of the associative law of „affective arousal" and its influence on the topic and content of the imaginative stories to be written. That does not rule out that test persons have poetic licence for their imaginative stories, i.e. they can exaggerate and achieve unfamiliar effects.

The definitive law for the construct validity of our test may be exemplified as follows. We are talking about a decision motivated by the awareness of one's own action competence. A truck driver sees a traffic situation and considers it to be competitive. He experiences that his motivation to perform competitively is activated. His behaviour can be compared to an exclusively mental process of coping with the

situation. Let us assume we can persuade our "racing driver" to imagine himself in a traffic situation where he is overtaken and to invent a story according to our test instructions. In all probability, the sheer mental effort of imagining will activate the same emotions of expectancy as in his perception of the real traffic situation, and he will write about the same motivating expectations that he had as a racing driver in real traffic (see the findings on emotion-related interpretations of TAT pictures and research on how the shape of blot images is interpreted, e.g. Fuchs and Grau 1962; Mücher, Grünewald and Fuchs 1964.

3.5 Experimental validation of topics stimulated by failure

Birney (1969) examined what effect experimentally arranged experiences of failure had on the content of TAT stories. The experiment gave another clue to the validity of diagnostics analysing the imagination. There was a significant increase in the number of units containing „hostile press" topics. They describe that all values of human welfare are threatened or destroyed by hostile influences. Statements of this kind are to be found in TAT stories produced under affectively neutral conditions.

Birney examined the frequency of these units among students of all age groups and interpreted their frequency as a symptom of the alarming significance of inevitable (school) failure among test persons. He speaks of a "fear of failure". Actually, he measured the strength of the motivation that averts school failure. That results from the following facts: test persons with above average frequency of „hostile press units" got better marks at all school levels from elementary to upper track high school than test persons with below average "hostile press topics".

How „hostile press topics" and success in school are related becomes understandable on the basis of Birney's findings that the „hostile press advocates" among children never got praise from their parents for success in school and were always reprimanded for their failures. To the extent that this had to be seen as punishment with parental withdrawal of affection, failure was indeed significant in a disastrous way and had to be prevented, wherever possible, by working hard in school. The characteristic values of „hostile press topics" varied positively among students at all class levels to the same degree that their school performance varied.

3.6 Various other indicators

a) Regarding the increase of units with performance topics in imaginative stories by stimulating motivation, it remains to be said: McClelland (1953) has proved that in stories produced after stimulating performance motivation, units with performance topics are significantly more frequent than in stories written under normal conditions. McClelland asserts that this increase in frequency is an indication of the validity of evaluations that analyse content in terms of motivation diagnostics.
b) Another indicator is the correspondence between the behaviour of the identification figure described and the test person's self-portrait in the interview.
c) An analogous test based on imagination analysis to assess the motivation for mathematical thinking could be statistically validated by counting the content

units and establishing the correlation between their frequency and school performance in specific subjects.

d) The production of stories with sustainability topics follows the law of conditional stimulation of the motivation potential related to sustainability and its effects in terms of increasing the test person's readiness to call up experiences linked associatively to the motivation potential. They are then called up according to the intended invention of a story. Hence, stories with sustainability topics are suitable as a basis for the qualitative analysis of various motivation components contributing to sustainability-oriented actions.

4. Main components of the motivation to act in terms of sustainability

As outlined at the beginning of this paper, sustainable development or sustainability relates to the three main components: economic issues (problems, conflicts), social issues and ecological issues (problems, conflicts). Now a fourth one should be added, which is climate change and its possible socio-economic consequences. One of the aims of sustainability is to try and solve problems and conflicts by always considering the main components mentioned above simultaneously. The issue is to prevent that, for example, economic problems are solved at the expense of social and ecological aspects. Nowadays, we understand how important it is to include climate change and resulting socio-economic consequences in any relevant analysis and evaluation.

Examples of the four areas mentioned above are not required. It is not difficult for the reader to realize that all these areas show problems and conflicts, and will continue to do so in the future, that consist partly of motive elements, partly of intellectual (cognitive) and emotional ones. It is possible that some people will not want to worry about sustainability at all, but simply experience nature, for example. Others might be motivated to act in such a way that sustainability is not jeopardized or harmed. Still others might be willing to contribute actively to sustainable development and to commit themselves with all their indivudual strength for this purpose.

In the following, the attempt will be made to refer to those sub-topics of motivation that might be essential for sustainability:

a) Going beyond previous performance limits: Let us assume that a student or young person has been supporting sustainability for some time. Because of changes in his personal scale of values, this person wants to commit himself beyond previous limits. To do so, the limits of his own performance must be expanded. That means, he wants to increase his own performance potential not as a means to an end, but to raise his self-esteem. Expectations are high. The person motivates himself and pushes on, even though strong doubts weigh down on him, but in the end, they will not determine his actions. In other words: the identification figure pursues a sustainability goal whose rank corresponds to an inter-individual reference standard. It is characteristic of such a psychic constellation for the person to examine success and failure closely, success through reaching one's goal and, consequently, achieving happiness.

b) Components and conditions of competition-oriented sustainability performance motives, i.e. being better than others: In this context, it should be pointed out that successful sustainability-oriented competition can contribute to popular approval and hence, to political success. In this manner, an important instrumental component becomes manifest, i.e. a component indicating the effort to be successful in sustainability performance and to oppose failure (not to disgrace oneself being a motive for training more successfully and also a means to overcome indecision). As for competition, it is possible that, during training measures taken in preparation, the intrapersonal and interindividual frame of reference for evaluating performance are applied together and complementing each other (Fuchs, 2004, p. 16). In other words: successful training can improve performance and self-confidence, the latter being an important mental component of the willingness to perform.

c) Teamwork: During individual efforts to achieve sustainability, the individual person is entirely on his own, ultimately in terms of success as well. By contrast, the entirely on his own, ultimately in terms of success as well. By contrast, the ability to co-operate in a team is important in group and team work. Individual performance is exploited in the group more or less well, depending on the situation. The motivation to achieve the best solution possible in one's task arises from both performance motivation and the need for approval of one's sustainability contribution within the group (‚need for affiliation') as well as the need to share success with the group. All components work together in the same direction. Within a group or team, the official, or maybe in-official, leadership figure plays a more or less active part, depending on his/her style of leadership.

d) Selecting competitors for special sustainability achievements: The objective to find highly qualified people for special, possibly innovative tasks (patents) can be simplified if one considers the following: the motivation of such people belongs to the motivation and intention dynamics called ‚long term ego involvement' examined by KUHL (1994) under the aspect of ‚maintenance of intentions' and the presentation of which was included in McCLELLAND's TAT stories as part of his motivation-diagnostic content key. He also added this ‚involvement' as a content unit to the key.

e) The project on successful applicants for the top group is titled positive ‚goal anticipation' (Ga+) in McCLELLAND's content key. The anticipation of failure is titled negative ‚goal anticipation' (Ga-). According to the content key, these two content units are counted as indicators for the strength of performance. The project ‚ego involvement' aims to show how one can make a career for oneself by being admitted to a cadre of maximum performance specialists. The strength of the motivation to pursue a goal of this kind might show in the intensity of emotional reactions to achieving or failing to achieve such a project. The strength of the motivation is based on the assumption that success is equivalent to progress in participants' life planning, whereas failure means a step backwards or possibly even the defeat of their life planning.

f) The inter-individual in contrast to intrapersonal frame of reference for evaluating performance as well as the significance of this distinction for the instrumentality

of motivation and for the motivation to learn: the intrapersonal frame of reference is applied successully in the aspiration level experiment, provided test persons, when choosing their level of difficulty, aim to find out and/or expand the current limit of their action competence regarding test assignments. It may be useful, when learning and improving expert skills, to have individual team members' progress evaluated within the intrapersonal frame of reference. HECKHAUSEN (1974) has discussed the underlying laws thoroughly, going back to the laws of forming a sense of achievement and its effects as researched experimentally by HOPPE and JUCKNAT. HECKHAUSEN had realized the specific advantages of intrapersonal performance evaluation when examining and expanding personal performance limits.

As for finding out and expanding performance limits, the intrapersonal performance evaluation has advantages for organizing an optimal training program that raises the aspiration level by raising the "optimal" level of difficulty step by step. This means that each higher level of difficulty is adapted to the preceding increase in skills. As has been proved experimentally and in terms of information theory as well as motivation psychology, the selection of an average level of difficulty relative to the level of skills achieved is especially favorable at every performance level, since the greatest measure of information can be expected here, i.e. the greatest measure of uncertainty reduction (see FUCHS 1976 as well as SCHMIDT & ZARN 1964).

5. The learning theory model of sustainability performance motivation

5.1 Experimental examinations

They give insight into the laws of transference. They show what effect success and failure have on the motivational structure of performance-oriented actions.

a) Transferring a sense of achievement (see the findings of GRAU & KLAUS 1975): These authors have carried out the following experiment: they formed two intellectually equal groups of elementary school students, only one of which was trained intensively in basic arithmetic with whole positive numbers (multiplication up to 10, adding and subtracting). Eventually, the students experienced considerable progress in their performance. When the rule of three was introduced, requiring some arithmetical thinking, the group trained in basic arithmetic proved to be clearly superior, although the speed at which tasks were done had no significance. What was transferred here as successful training was apparently an increased appetence for arithmetical tasks as well as an increased self-confidence in one's own learning capacity. Such a sense of achievement, by which motivation is organized, shows in the findings of the test on levels of difficulty (aspiration level test) carried out by JUCKNAT (1933 and 1987). Once a selected problem had been successfully solved, the next step was nearly always to choose a more difficult problem, i.e. the aspiration level was raised. The underlying increase in self-confidence is to be understood as a transfer of previously experienced success.

   As for the effects of experimentally arranged experiences of failure, different reactions of autonomous, self-confident experimentees (giving voluntary personal information) and insecure experimentees were compared in a thorough

examination. The result was that insecure experimentees gave up very early on problems that could not be solved, whereas the self-confident ones worked on the problems for a long time and (as followed from their „loud thinking“) tried to find the source of error and develop new strategies (see DIENER and DWECK 1978). The reactions of the insecure group of experimentees corresponds to the behaviour of discouraged failures in school. These students are exposed to a sequence of problems they cannot solve. The majority of students, however, does solve the problems, so that the other students are denied a tranfer of causes that could encourage learning and they consequently give up on new tasks very early.

The experiments on the effects of success and failure described above demonstrate the laws of transference effects. A representation of the success and failure spiral in form of a flow chart can be found in FUCHS 1995, p. 166ff. and p. 2254ff. as well as in FUCHS 1991. This diagram shows the interaction between failures in school and frustrated teachers in particular.

b) Experimental examination of the transference of reactivated experiences of success to the understanding and execution of similar tasks – based on an individual case study: Activating the motivation for competition-oriented behaviour in traffic situations corresponds to everyday experience. It also exists in the context of the sustainability process. An experimental examination is required to explain the underlying reaction potential, its activation and its effects on sensomotor actions. Special consideration should be given to the mental connection of the release signal („cue“) that prompts associations with the motivation potential to be reactivated. The prevailing laws will not be dealt with here. The following explanation is limited to a case study. This individual case study was concerned above all with the question of what effect the associatively reactivated awareness of success had on the execution and solution of a performance-oriented task. In particular, the following question was addressed: by means of what procedures the reactivated expectation of success is transferred to a new task. What had to be done was to connect, by means of associations, an experience of success with a reactivation stimulus, so that in future the transference of this reactivation stimulus, e.g. the acoustically transmitted words „here and now“, could make the experience of success topical again emotionally and cognitively, i.e. raise it to the level of awareness and prompt action motivation. For this purpose, an experimentee’s personal experience of success was remembered under hypnosis, reactivated, verbalized and then connected to a reference stimulus by means of hypnotically transmitted suggestion, so that post-hypnotic reactivation through the reference stimulus in question could be counted on.

c) Each step of this test program was carried out as follows: First of all, a task had to be chosen. The choice fell on a steady handstand without any help and without a supporting wall. The test person thought that he was just as likely to succeed as to fail. After the selection of this task, the idea was for the test person to choose a personally important experience of success, which he did after

thinking about it. It became clear from his subsequent report that he had indeed chosen a highly significant experience of success. This experience, stored in his memory, was then to be associatively connected with a signal stimulation. It was achieved using the following procedure: the test person was put in a hypnotic-type state of immersion, in which he was asked to remember the outer circumstances and the order of events in that specific experience of success and to reproduce what his aim had been, what he had actually done and finally achieved, and, above all, what personal importance success had had for him, intellectually and emotionally. Parallel to this reproduction, he was asked to go on talking about what he had reproduced. The aim was to put the test person in a mental state of fully recalling his experience of success. The test person completed this task remarkably well.

d) Whichever way one might evaluate the conclusiveness of these experiments, they are suitable, in any case, for demonstrating what McCLELLAND understood to be the „affective arousal" of performance motivation (conditional on associations). As for the transference of the reactivated experience of success to a new task of the same type, this transfer is arranged through the stored generalization of precisely that experience of success as completed with the qualifying interpretation of success. The results of this generalization are the patterns of psychomotor movement control, a generalized confidence regarding success and the procedures of positive evaluation regarding athletic achievement and skills. By means of reactivation, all patterns and procedures are made ready to be called up and then called up to structure activation and its management.

What is not considered in this paper: the conditional activation of the motivation to perform competitively using everyday situations that relate to performance and can be interpreted – explained with the help of an individual case study; nor the reactivation of the emotional representation of a task in its dependence on action competence (rejection or helplessness) and thorough activation as the antagonist of boldness.

5.2 Developing motivation potential

It is in terms of specific action fields according to the laws of learning illustrated in the success and failure spiral: McCLELLAND postulated the existence of a performance motivation potential that can be stimulated through all kinds of responsibilities by structuring performance topics. He put this characteristic down to the generalized effects of maternal education focussing on independence (see WINTERBOTTOM 1958), this generalization being based on a lacking ability to differentiate due to developmental factors. In this context, it should be pointed out that educating small children to be independent (with interindividual variations within a spectrum reaching from excessive demands to excessive protection) explains the varying parameters of performance motivation potential to a large extent. This is indisputable, but requires further comment, nonetheless: since, when maternal education with regard to small children's independence has come to an end, organized learning of performance motivation potential has not. Organized learning continues when children begin to go to school. In school, children are confronted,

from elementary school to final examinations, with performance standards and demands in various fields – in the context of selection, as is customary in our school system. Compulsory performance goals as goals of learning can only be attained by solving a number of didactically predetermined learning tasks in specific fields. If they are successfully completed due to a strong willingness to learn, area-specific performance motivation develops as a result. This shows, for instance, in learning how to read or do sums: the child makes rapid progress in those subjects and develops self-confidence and, consequently, an appetence for those subjects, the more so as successful learning usually finds the approval of teachers and parents. Thus, the willingness to learn in specific fields increases. What results for the willingness to learn is a feedback loop accompanied by a whole string of successes.

a) If the willingness to learn is lacking and the feeling that demands are too high results, then the prescribed performance level is not attained and seems unattainable, which usually leads to discouragement and fear regarding the tasks in question, and an aversion against those tasks is developed. The willingness to learn is weakened even further. What we have here is the feedback loop of a motivation-organizing failure spiral. Of course, the feedback loop of a whole string of successes or failures in school and club sports is similar. This gives a clue to the issue we raised at the beginning about what is examined or measured with our imagination-analytical test: stories about performance are the result of a history of learning in which the success spiral led to to a preference for certain kinds of sports. The athlete faces up to a performance goal, trains for it, tries to achieve it in competitions and experiences success or failure depending on results. As for the issue of failure, the fear of disgrace is looked at, the fear of disappointing the expectations of parents, trainers and friends, the fear of failing in a sports career and the fear of a serious sports injury. Accordingly, our test analyses performance motivation potential in specific fields and not across fields.

b) According to the conception of cross-sectoral performance motivation in terms of learning psychology (by McCLELLAND as well as ATKINSON and HECKHAUSEN), one would expect students who began their school careers with high values for cross-sectoral motivation potential to be less susceptible to failure and better equipped motivationally for starting a whole string of successes building on one another. Therefore one would have to derive from the theoretical conception of the performance motivation construct (see HECKHAUSEN 1980, p. 23 ff) the corollary that highly motivated students (i.e. those with above average values for performance motivation) do a lot better at school, on average, than less motivated students with below average values for performance motivation. This, however, does not apply to values determined according to McCLELLAND's procedure. For the values determined in HECKHAUSEN's procedure, there are significant, but unsatisfactory, correlations of 0.3 to 0.4, so that only a small part of the variance (10% to 15% of school achievements) could be explained with variance in the measured strength of performance motivation (see LERCH 1979).

c) These diagnostic shortcomings are most likely to derive from the fact that performance motivation is organized to a large extent according to specific subjects, so that general performance motivation across action fields is relatively insignificant for school achievements. This assumption is in keeping with the fact that, as far as achievements in mathematics are concerned, there are highly significant statistical differences in subject-specific performance motivation between students with good, mediocre and inadequate achievements. These differences explain the variance of mathematical school achievements in a satisfactory manner (FUCHS 1979). Therefore, the construct of cross-sectoral performance motivation formed in childhood as a personality feature needs to be supplemented with a motivation concept in which the entire learning history of performance motivation is considered. This supplement is indispensable for predicting school and job achievements. In particular, the concept of a fear of failure seen as a personality feature that can be diagnosed stands in need of supplementing. HECKHAUSEN himself has already examined the concepts of performance motivation in the sense of a cross-sectoral, stable personality feature.

d) The results of Schmalt's grid test were decisive for the change in HECKHAUSEN's views. Schmalt proved that the strength of performance motivation varied in different action fields (1976, quoted according to HECKHAUSEN 1980, p. 263). By means of factor analysis, the test also demonstrated the existence of two components of so-called „fear of failure": one of them an achievement-promoting aversion against failure directed towards error avoidance, the other an achievement-restraining aversion against failure accompanied by a loss of self-confidence. These two variables are statistically orthogonal. The aversion component promoting achievement shows diagnostically in the grid test in that the test person agrees with given statements regarding various action fields as, for instance, „He is thinking whether he did anything wrong", „He is afraid that he could do something wrong", "He doesn't want to do anything wrong." The achievement-restraining variable shows in the agreement with the following statements: „He thinks he can't do that", „He'd rather not do that."

e) The first three statements express a tendency towards error avoidance that, if sufficiently strong, leads to the same goal as „striving for success". The last two statements express that any pretension to achievement has been abandoned in a specific field. This reduces the fear of failure or does not even allow it to surface. This tendency towards failure avoidance does not meet the criteria of the performance issue and, in this sense, it is not permissible to rate this type of "escape motive" as a component of performance motivation. To determine, qualitatively and quantitatively, the many different ways of stimulating performance motivation (extensity), instructions of the STA test can be used, along with the grid test, by modifying the action field. In this manner, by referring to respective task fields in the instruction, e.g. a task in mathematics, science or the arts, task-specific performance motivation can be qualitatively understood and quantitatively diagnosed by using a McCLELLAND-type

content key geared to the task field. In any case, it is a topic-specific prompting of the imagination and the analysis of its content, i.e. a procedure that corresponds to the laws of motive stimulation and its effects on the imagination. What is diagnosed in terms of each specific field is the result of a personal learning process characterised by experiences of success and failure.

f) The following story of a 12-year-old high school student demonstrates the motivation-organizing effect of his subject-specific failure in the action field of mathematics. Max was trying to cope with a task in mathematics. Again, he was feeling anxiety, anxiety about not passing, and he was dripping with sweat. Full of despair, he asked the teacher how much time was left. The teacher answered in a pronounced tone of voice: „Ten more minutes, no – only nine. Don't forget that, for some of you, a whole year is at stake." Max was at the end of his tether. He knew the teacher was talking about him. He got into a panic. He knew the correct answer to the problem, but he was constantly making writing mistakes. He erased everything and asked in a shaky voice: "How much time is left now?" The teacher said loudly: „Two more minutes. Everybody listen: two more minutes." Max was incapable of going on. Everything he had learned was wiped out of his mind. Two more questions. He suddenly remembered the answer to the fourth question. But by then, it was too late. The teacher said with a determined voice: "Put down your pencils! I'll collect your papers now." Ten days later: the teacher gave the test papers back, and Max knew he could only have gotten a bad mark. The teacher approached Max's table, and he said with such a cold voice that it hurt Max's ears: "You don't seem to have understood how serious the situation is. If I were you, I'd start to learn." But he had learned, and he had understood the gravity of his situation. He would fail maths in his report card if he didn't get a good mark in his next test.

The author of this story is in that phase of the failure spiral in which the struggle to avert failure is still going on. This struggle, however, is seriously disturbed by a disorganizing fear. For further remarks on the topic of the failure spiral, see FUCHS 1990, p. 71 ff. Analogously to the success and failure sequence in mathematics, there is one in sports and in the action field of sustainability.

5.3 Discussion

It is in terms of motivation psychology, of the success and failure spiral related to the model of sustainability: The personal learning history of motivation potential related to sustainability can run in close connection with the learning history of controlled psychomotor movement patterns. Learning histories include a hierarchically structured sequence of learning steps that organize ability and motivation. Organized motivation becomes manifest in the progress of success appetence and success expectations and, consequently, in the willingness to learn. To that extent, it is also a feedback loop.

a) Every learning step motivates, and its learning success increases the willingness to learn for the next step. This improved willingness to learn is based on an increased aspiration level and appetence for the next learning step, on the one hand, and on the improved basic knowledge required for that step, on the other

hand. Appetence and success expectations are a motive for wanting to do things. The previous learning success thus leads to an increase in the aspiration level and initiates success expectations and appetence accordingly, together with improved basic knowledge. If such a sequence is continued, achievements improve profoundly, and a success spiral is created (see FUCHS 1995).

In analogy to the success spiral, we have the model of a failure spiral as a counterpart, with a reversed plus/minus sign, as it were. This failure spiral is a feedback loop that decrease the willingness to learn and the continuous repetition of which defines achievements at ever lower levels. In the first phases of the failure spiral, there are efforts to compensate with the aim of improving achievements. When these fail, there is a strong likelihood that failure will be put down to a lack of athletic talent and that this cause will lead to a strong motivation for avoiding requirements specific to certain action fields. In this context, the tendency to avoid the burdening of self-esteem and social decline as a consequence of failure plays an important part. This tendency is the motivation for an attitude of avoidance that damages performance, which DÖRNER called an „escape attitude", although in a different action field. HECKHAUSEN called this attitude instrumental failure avoidance in the content key (for „fear of failure"). Its manifestation in an aversion against athletic tasks is particularly clear, as demonstrated in certain STA stories.

b) Attributing causes in the context of the success and failure spiral: we want to point out here that, where success is concerned, there can often be no doubt about its being caused by relevant qualifications of the actor. Moreover, it can be assumed that particular actors, when they look into the causes for their ability to perform, will doubtlessly name previous training as well as concentration as the causes for their success. That is particularly true if they applied a learning strategy during training. In addition to performance progress achieved during training, the assessment of one's own learning capacity comes into play as a cause of success. The learning capacity of an actor is defined as a parameter for the efficiency of his learning and shows in great learning success, achieved with relative ease. The actor concerned usually understands this manifestation of learning capacity to be an indication of his own natural abilities.

Of course, the learning sequence of the success spiral also includes failures. However, students or employees do not take them as indications of being less gifted; rather, they do a reality-oriented analysis of them with the tendency to find out the cause of failure, so as to avoid such mistakes in the future. Thus, attributing causes in this manner is mainly of instrumental significance and falls into the category of claims to the validity of verifiable hypotheses. Therefore, students who have become confident of their achievements by means of a success spiral use failure as an occasion to learn from mistakes. By contrast, those who are not confident of their achievements often interpret failure in terms of lacking talent, and their "escape motivation" is further increased. What we have here is an attributing of causes that reinforces the failure spiral.

The significance of failures that support performance, the analysis of their causes and their instrumentality in the context of a success spiral, as well as the

performance-impeding attribution of causes in the context of a failure spiral, have been proved in the following experiment carried out by DIENER and DWECK 1978 (see HECKHAUSEN 1980, p. 470 ff). The reactions of 11-year-old students to their handling of objectively insoluble problems were investigated. Two groups were distinguished: one was confident of its performance and autonomous, the other insecure in its performance and less autonomous. They were distinguished on the basis of information they gave about themselves in a questionnaire.There was no difference in the performance of both groups in an early phase of the experiment where they learned how to verbalize their problem-solving efforts through "loud thinking". However, in the main phase of the experiment there was a significant difference. While the test persons who were insecure in their performance were unsuccessfully dealing with the insoluble problems, they verbalized their incompetence as being the cause of failure. By contrast, the test persons who were confident of their performance showed the following attitude: they avoided any causal attributions in the sense of lacking ability. Rather, there was a tendency to improve performance through more concentration as well as better error control and avoidance, i.e. an attitude that, where soluble problems are concerned, offers the best chances of success and thus favours the success spiral. In the various tables showing the categories of cause attribution, the category of learning capacity, in our view, seems to be missing, which is also the category of individual talent, i.e. the assessment of what can be achieved through consistent practice, training and mental self-control. Trust in one's own learning capacity, i.e. the firm belief that learning is possible, is expressed clearly in the various stories. Confidence in one's own learning efficiency is based on personally experienced learning efficiency in connection with the causal attribution of success as learning success. With this attribution, one's own talent and natural athletic abilities are also being attributed indirectly as conditions of learning capacity.

c) Additionally, we would like to point out: the success and failure spirals of all people depend on the natural abilities of the individual, for instance in the field of sports. Analogously, that is true for all fields in which, in one form or another, physical demands are made among others and corresponding achievements are expected. Genetically conditioned differences of the movement apparatus and/or circulation conditioned physical staying power explain the different expressions of performance motivation potential even more accurately.

In this exposition, the general laws of organized motivation have been discussed. What emerges, in each single case, as the individual result of this organization (in particular: how test persons cope with the problems to be solved) remains to be examined in terms of individual diagnostics. Above all, the various components of performance motivation and their instrumentality have to be worked out accordingly.

6. How motivation psychology and the psychology of will are related

On the laws of interaction between motivation, will and actions: the term of will and its motivation are concepts of experience, handed down colloquially. Normal

adults understands their meaning on the basis of their own experience.They know what they want, and they know why. Accordingly, their will is a given phenomenon and can be expressed as „I really want it“ (ACH 1935). A feeling of commitment is often part of the phenomenology of will KLINGER 1975). This phenomenology is often inadequate for researching human actions. To be able to understand, influence and predict human behaviour, the process of will formation (ongoing present-day genesis) and especially of action planning and the interaction of intentions, motivation and self-confidence need to be analyzed. Dividing human actions into two parts, as HECKHAUSEN suggests, a motivation phase and a volitional realization phase, is only applicable in a limited way, since the adaptation to many different risks, when fixing the ultimate goal, is often achieved by keeping options open in the case of failure in partial tasks, so that one depends on new value assessments (see OESTERREICH 1981). In this regard, the will of a volunteer and enforced will have to be distinguished. Cases of volunary will are the identification figures (Ifs) in stories with the common topic of striving to expand one's own performance limits in non-competitive situations. In some situations, however, social pressure is so great that voluntariness no longer applies. A social extreme of involuntary action can be the intention to execute an order subject to military authority and with the obligation to obey. The following elaborations apply, provided actos have freedom of choice. Under these conditions of will formation, the weighing of appetences and aversions plays a decisive role, as does risk calculation on the basis of self-confidence regarding demands. The same applies to overcoming difficulties and the effort needed to do so. This will formation, however, can vary from one case to another between thoughtful and thoughtless deliberations. Moreover, deliberations may be impossible under time pressure, but spontaneous behaviour would still be more advantageous than doing nothing (see DÖRNER's description of "emergency reaction").

As for will formation concerned about optimization, assessments of the effort required also play an important part. Moreover, efforts are regulated purposefully during a competition. In this respect, the effort concept plays a decisive role in the planning and execution of actions. Beyond that, the willingness to make an effort is an essential component of performance motivation potential. In view of its importance, it is reasonable to mark the willingness to make an effort as well as the effort itself as a variable that can be measured. The following measuring procedures are considered:

a) The biomechanical measurement of the number of watts (see bicycle ergometer). The extent of an effort is defined as the measure of physical performance in relation to the performance level the test person can attain.
b) The subjective assessment of an effort as the basis for volitional effort regulation during a competition.
c) Scaling classification as the basis for verbalizing degrees of effort.

Action plans have the functional structure of „determining“ in what sequence what things are to be done: when, where and why, taking into account one's own action competence. Planning has to consider that the relevant components may have a high degree of uncertainty during various planning phases of will formation, which is

sufficient, however, to roughly estimate feasibility. In this sense, ACH and DÜKER (1935) speak of the degree of determination specificity. Specificity is a highly significant variable for the competence to act as planned. It can be optimized by working out alternative plans, for instance, keeping open options for sub-goals (see OESTERREICH 1981). Incidentally, specificity is very time-consuming and can be detrimental to will formation if the threshold value for the tolerance of the remaining risk is too high (see KUHL & BECKMANN 1994).

When an appropriately specified action plan has been formed, the process of will formation is basically completed and generates the intention to carry out the action plan. The actor is aware of this intention generated through such an act of will (ACH 1935). If you are determined, you know what you want. You want to carry out an action plan that is suitable for attaining a worthwhile goal. Generally, the actor also knows why he wants to do so, and if he does not have this knowledge available, he can call it up. Accordingly, an intention along with its motives has been entered into a motivation and intention memory.

7. Concluding remarks

In this paper, we cannot consider: conflicts in long-term projects; structuring the motivation for goal-conscious behaviour to include an active, goal-oriented component and one that avoids failure.

The following distinction is important. Therefore, it will be briefly explained. In the FUCHS model, there is "the component that averts failure or is reluctant to accept it", and it must be distinguished from the "fear of failure" as postulated by ATKINSON, HECKHAUSEN and McCLELLAND (Fuchs 2004, p. 41).

An actor avoids risks. He does so, however, not because of "fear of failure" (with an "escape tendency"), but rather because of "the component that wants to avert failure or is reluctant to accept it" ("coping attitude") To call the latter component of performance motivation "fear of failure" is misleading.

Neither can we consider the measuring of the field-specific strength of performance motivation, nor the problem of measuring motivation strength across fields. Also, the nature of sustainability-oriented action potential can only be explained in a later, more comprehensive study. In spite of the shortened text of this paper, readers can find enough information to get a tentative idea of the topic: ‚Need and Possibility for Analysing Human Motivation Potential Related to Sustainability.

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Rainer Fuchs*

Goal-oriented Action: The Interaction of Process Components in Terms of Cybernetic Theory

1. Connection to pre-scientific action

A sub-discipline of action science is general behavioural science. Human action is a kind of behaviour. However, according to usage, mental activities, e.g. thinking, do not belong to the concept of action. Research must tie in with action knowledge. According to R. Fuchs (1995), *with whom the comments in this part of the paper originate,* the psychology of action science "contributes to understanding the problem of reality cognition by tracing the validity criteria that actors are guided by when they distiguish between assumptions, errors and truth in their purposeful actions." Usually, humans are aware of themselves as acting persons, i.e. they know their strengths and weaknesses. That may refer, for example, to the planning of actions in time and space or to the use of means and procedures that imply the observance of rules and laws. The question also arises whether an effort is compensated by a gain or benefit. This is where action psychology comes in.

Fact is that actions are psychically controlled. The underlying system is passed on to the human individual as a developmental and learning potential. "The psychic system is linked to the locomotor and the cardiopulmonary system not only through the emission of control impulses, but also through feedback effects from the 'organic periphery'. (R. Fuchs, 1995, p.7). The interaction of components such as motivation and action-guiding and -controlling sensory information is especially important for the continuous operative mapping of the action field by means of sensory perception, thinking, learning, empathy and memory.

2. An illustrative example

The example taken from the book by R. Fuchs (1995) *in shortened form* shows how different action and process components work together in a major action. "To demonstrate how action components at different functional levels work together, we have chosen the carefully planned escape of a victim of political persecution from a dictatorship to a free country. The reason for wanting to escape is the actor's political ethos and his anticipation that he might be arrested in the forseeable future, which according to the evidence of a political friend already detained could end with his coming off lightly, but could also lead to several years of camp imprisonment.

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* Rainer Fuchs Prof. Dr. Rainer Fuchs (Emeritus TUM), Feldafinger Straße 15 a, D-82343 Pöcking, Tel.: 0049-(0)8157-8627.

Such attempts to escape from countries along the eastern and southern Baltic Sea actually occurred. Let us assume the following scenario for the escape: the only possible escape route is across the Baltic Sea to Scandinavia, which means a route of several hundred kilometres on high seas wthout any land.in sight. However, only a few secret paths can be used because of surveillance forces specialized in preventing flights, and these paths lead through areas full of mines, so that only two narrow passages cleared of mines are available and only insiders know about them. Using these passages puts high demands on precise navigation.

The actor is only roughly aware of this scenario, so that he is not in a position to estimate the risks and chances. Therefore, he is not in a position, either, to decide about the escape. A necessary requirement for such a decision would be the elaboration of an action plan including all essential details.

The transition from a state of wishing to a state of being determined by means of action planning – instrumental preparation and the consideration of risks and chances. First, we will look at the action-psychological issue raised by HECKHAUSEN of how the determination to engage in such a risky undertaking matures, or more generally: via what stages the goal of a wish becomes the goal of what is willed or a state of indecision changes to a state of determination. (HECKHAUSEN 1984: From wishes to action. The dead ends and short cuts on the long way to action.)

In our example, we start with an early stage of wishing. The actor wishes to live in freedom and security and has already specified this goal. He wants to escape from the sphere of control of the dictatorship at home and live in a free country. The wish leads to the question if the desired goal can be realized, and that entails the motivation to investigate the possibilities of leaving the country. A first rough estimate produced the result that such a project might be feasible, so that the wish for freedom combines with a respective degree of hope.

According to the value-times-feasibility-principle, this is of great importance. For now, the actor is motivated to choose the most promising of the possibilities of realization that he considered, e.g. make a pre-selection among the undertakings of legal departure, flight across the Green Line or escape on the seaway. This requires thinking through and substantiating possible escape plans from the viewpoint of demands and one's own resources. Thus, regarding the seaway option, the actor recollects that he has a sailing boat of his own and trusts his skills as a sports sailor. In view of such resources, the actor gives this escape option an acceptable chance and, after checking out the other options, prefers the seaway. Thus, he is motivated to plan the selected escape option more thoroughly. Consequently, the way to the desired goal is tolerably specified, but the actor is still far from being determined to escape. In other words: the decision-making problem has not been solved yet, it has only become more clearly defined. It boils down to the question whether it is possible to

escape across the Baltic Sea to a Scandinavian country in one's own sailing boat.

What follows for the actor is the task of working out a corresponding escape plan under the aspect of its feasibility and, apart from resources, that requires to determine obstacles and shortcomings as they may be found in the environment and one's own person. Hostile influences and friendly support also have to be expected and considered. Thus, the feasibility problem boils down to the task of eliminating the obstacles and shortcomings and of finding a way to avoid hostile influences as much as possible.

Considerations and preparations of this kind are typical for the will formation of the realistic and circumspect actor. If they are neglected as, for instance, by tourists in high mountains, who lack experience and are insufficiently equipped, or by manic economic speculators, failure is preprogrammed.

The actor in our example acts in a level-headed manner. He considers the problems and risks of sailing on high seas. He realizes what dangers emanate from governmental surveillance and remembers to have heard of areas packed with mines. Therefore he attends to the improvement of his equipment with great care and manages to get a topographical map of the mined areas from a political friend, areas neglected by surveillance and with mine-cleared passages drawn in. Moreover, he improves the equipment of his boat and, in particular, procures a more efficient navigational instrument and improves his navigational competence by training meticulously.

Let us suppose the actor has effectually eliminated his misgivings in this manner, but has not yet completed his preparations entirely according to plan. All he needs, really, is another piece of equipment, the delivery of which, however, he can only expect within a few weeks. In view of his impending arrest, the actor is pressed for time. He has also found out that surveillance has been tightened and, consequently, the chosen seaway is threatening to become less safe.

What is called for now is the personal command centre, the inner captain of the whole enterprise, as it were. The actor is still master of his decisions. Now, he has to reconsider the chances and risks of the entire undertaking and to balance the value gain of living a life in freedom and security, taking into account the probability of a successful escape, against the negative value gain of aggravated punishment, taking into account the likelihood of failure. The reference level against which the value and non-value gains are calculated is the existing non-value level of an abandoned escape. It is characterized by the negative value of likely but comparatively mild punishment.

The transition from wishing to wanting or from hesitancy to the determination to risk something is effected when the hoped for value gain expressed in terms of probability clearly exceeds the feared value loss expressed

in terms of probability. Both probabilities are evaluated on the basis of the action plan.

Let us suppose the high value gain combined with an acceptable likelihood of realization in view of the current state of preparations has tipped the scales and the actor has decided to escape. In that case, the wish would have changed to an intention and the desired goal to an intentional goal of action.

Insofar, the path to determination has passed through the design and, possibly, elaboration stage of an action plan quite likely to be realized. This action plan must be acceptable, however, with regard to its overall value, i.e. including delays, sacrifices and needs. This often requires the elaboration of compromise plans that keep the negative values of side effects as low as possible and the welcome ones as high as possible. The decisive aspect of determination is always the actor's calculation of total value and total non-value. The certainty of "I am going to do it!" compared to the previous uncertainty increases the likelihood that the actor will reach his desired goal, but also the likelihood that the attempt to escape will be made, will fail and be punished. In this sense, determination is also characterized by a strengthening of motivating expectations. The condition of determination could be shown in a simple inequation:

$(W_G - W_V) \cdot p + (W_M - W_V) \cdot (1 - p) > 0$

W_G = value of wish fulfilment through success

W_V = value level of the current situation given that escape is abandoned

W_M = negative value of punishment in case of failure

$W_G - W_V$ = value gain

$W_M - W_V$ = value loss

P = likelihood of success

$1 - p$ = likelihood of failure

However, this inequation obscures the fact that the actor can only roughly estimate the relevant probability factors. This should be taken into account, since the uncertainty of probability assessments is a major factor of indecision.

The formula also obscures the uncertainty of value assessments, which needs to be considered, as well. The value and non-value of a goal are represented as value knowledge as well as value feeling, and feelings about values are strongly dependent on moods. Moreover, value assessment neglects the evaluatiuon of side effects in terms of their probability. Thus, for instance, when escaping from a dictatorship, one has to weigh the non-value of kin liability regarding the mother who stays behind against the probability of these terror tactics actually being applied.

The resulting degree of determination can be illustrated by integrating it in the action-determination-diagram worked out by NITSCH and HACKFORT

(1981). There, the entities "task", "person" and "environment" are given as determinants of action.

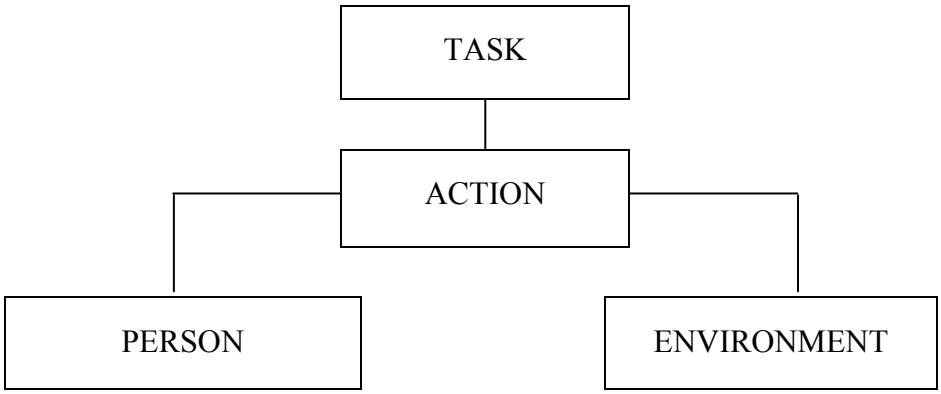

Figure 1: Determinants of action

The actor, having made his decision, must now deal with the *task* of realizing the intended action plan. As the *person* who determines the action, he has stored his action plan along with his reasons and intention of implementing it in his memory and is equipped with the essential resources needed for execution. One of them is a topographical map of the seaway and knowledge of the impact of wind and waves. Action as determined by the *environment* includes the instrumental equipment, the position of the boat at any one time, the sea, the weather and hostile surveillance. The autonomous reality of these environmental factors determines action by demanding attention and responses throughout the sea voyage, e.g. with regard to the topography (navigational monitoring and control), with regard to wind and weather and the aerodynamic exploitation of rig and rudder. All responses must conform to the action plan and situation on hand.

The example of the transition from a desired to an intentional goal has not been fabricated. The development of the decision to escape follows the law that specifies the determination to act as examined by Narziß ACH and Heinrich DÜKER as well as the value-times-probability principle of motivation worked out by Kurt LEWIN and subesquently applied by ATKINSON (1958). This principle has been applied here to the motivation for action planning, to the model of planning and mapping structures of actions elaborated by MILLER, GALANTER and PRIBRAM (1970). The content of the story, as regards the described scrutiny of personal resources, corresponds to DÖRNER's experimental findings on the importance of self-reflection for successful actions (1981). As regards time pressure, it also corresponds to the pertinent assumptions of the same author concerning the importance of urgency (1987).

Furthermore, our example of escape follows the structure of escape actions performed by POW friends and relatives that I have had access to as well as the invented stories of TAT about human endeavours involving high risk and high

demands on performance. These phantasies are predominantly about coping with obstacles in the environment and in one's own person; also about coping with hostile influences (hostile press) and relief through friendly and supportive influences (nurturant press). All four content components appear in the invented stories, and they do so the more frequently the more strongly the authors' expectation of success and failure has been stimulated experimentally (McCLELLAND et al 1953). It has also been proven experimentally that the frequency of these content components allows to conclude that respective efforts are made in reality when demanding situations force decision-making.

However, our example is characterized by the fact that the actor found time and the opportunity to plan his undertaking carefully, and he decided to execute the plan only after assuring himself that its realization was promising. Such conditions are not always fulfilled. Often, one must decide under time pressure. But even then, a decision not entirely thought through is not made haphazardly, but according to certain "heuristic strategies" (DÖRNER et al 1983, p. 412ff. and 1985, p. 161). Even when there is no time pressure, heuristic strategies are "always appropriate when goals are aspired to whose realization cannot rely on suitable action patterns, but the hope exists nonetheless that one can find out what has to be done." For certain problem fields, entire heuristic systems have been compiled. One such system of heurisms has been worked out by POLYA (1962) to solve mathematical problems.

Most likely, heuristic strategies were also applied to solve the problems of equipment and procurement as the sailing boat escape was being prepared.

3. Acting in the phase of plan execution

At this point, we will continue our description of the escape and move on to the actual execution phase.

According to the action plan for the escape with its hierarchy of tasks and subtasks, the actor, as soon as he set out on his sailing boat, was not only his own captain, as he had been before, i.e. his own information and command centre, but also his own navigator. Furthermore, he was his own helmsman and his own sailor for setting the sails and controlling propulsion as well as his own machinist for operating the auxiliary engine.

This role distribution is paradigmatic for all actions that involve the execution of plans. They require the role of the "captain" throughout, i.e. a coordinating command centre; the role of the navigator who executes the function of watching which stages of the plan have already been realized and reporting results to the command centre, so that it has a clear picture of what has been achieved and what remains to be achieved; the role of the helmsman who is instructed to carry out the operative progress of plan realization; and the role of the machinist who is expected to regulate motivation, i.e. endeavour.

As the captain, the acting person is bound to his self-directed or adopted, overriding task and, to that extent, is limited in his freedom to make decisions,

but even so, he must be actively in charge “on site” in case of instrumental alternatives.

That opportunity will come up often enough as, for instance, in the escape described above when, after having collected the navigation data, the captain must decide whether to steer a safer or a shorter course.

The hierarchical structuring of subactions is also paradigmatic. Thus, the overall action of a steering manoeuvre is divided into the subactions of navigation and directional steering. Navigation is again divided into using a sextant, compass and chronometer. The subaction of calculating the read data to determine the position of the boat depends on those instruments. In the same way, every subaction is divided into further subactions right down to the level of coordinating eye movements for reading scales or grasping movements for pickung up a pencil. Accordingly, determining the nominal direction and directional steering are divided into subactions.

In this sense, the entire action of the sailing trip is a hierarchically and sequentially structured process (HACKER 1973).

Clearly, hierarchical-sequential structures of ths kind can be found in a more or less distinctive form in any reasonably consistent action. as, for instance, on a business trip with various matters having to be dealt with or on less important occasions such as writing and sending off a letter.

Every sub-action is cybernetically structured, i.e. a goal is anticipated in relation to an existing condition, and an action is then planned and executed..

This cybernetic structure is specifically formed at the level of psychomotor activity. For instance, if you have the intention of pickung up a pencil, you look where the pencil is, and by processing the data provided by the eye concerning the direction and distance of the pencil, a (trained) action pattern of reaching out and grasping the pencil is fed with these direction and distance data, anticipated as a motion sequence, intended and executed. The motion sequence is continuously controlled by the sensory functions of the eye and mechanosensors. In this way, sensory feedback is compared with the planned movement, and the result of the comparison effectively controls the movement via feedback to the cybernetic action to be executed. According to this comparison, commands are given to make adjustments even during execution Near the end of the process, by comparing the achieved with the intended action result, an impulse is given to stop the movement. Consequently, a new situation exists (i.e. you have a grip on the pencil and are ready to write), and the act of writing is controlled in a similar manner.

At this level and at higher levels of coordination, controls and instructions are carried out by stages. When the last subtask of navigation has been achieved, the result is registered as the successful execution of the higher-ranking navigational task. According to the higher-ranking action program of direction regulation, an appropriate steering order is given and carried out as a new sequence of subactions. All this happens according to the superior action plan,

each ongoing sequence of which can be called up from that part of memory where intentions are stored.

Generally speaking, this control structure of hierarchically-sequentially organized actions is typical of all actions. The progress and result of each subaction are compared with its anticipation, and when the respective (sub)goal has been reached, the next action goal (at the same or a higher level) is focussed on according to the action plan. By means of controlling the results related to subgoals and reaching out for the next subgoal, the action field is continuously mapped in terms of actions and, thus, operatively structured.

There are great differences in this type of control depending on the action plan. Action plans can be worked out more or less specifically with regard to subplans and, accordingly, require more or less improvisation when it comes to subactions. In chess, operative mapping results from a clear understanding of the current game position and the operative possibilities of chess moves. However, the selection of these moves does not result unequivocally from a superior game program, but must be determined by a heuristic problem solving procedure in each individual case. Such heuristic control programs are in particular demand where control tasks with a high degree of complexity and uncertainty are involved. In such cases, the task is to control a complex system without sufficient knowledge of how the essential state paramters interact. Thus, the actor has to rely on speculations, at first, and develop an action plan for establishing hypotheses and for checking them on the basis of the effect his intervention in the system entails. With this program, he can acquire the know-how he needs to control the system and then pursue his goal with predictable consequences.

S*ummary*: actions at a high level of integration are planned and executed hierarchically-sequentially according to an action plan. At issue is always the value gained by achieving a desired goal as well as the prevention of a value loss owing to the failure of the attempt to achieve the goal. Value gain and value loss refer to to the value level of a need at the point where it is abandoned, and it is integrated values or non-values that are concerned and identified taking into account the disadvantages that might have to be accepted as well as the anticipated advantages.

The integrated value gain as well as the integrated value loss are multiplied by the likelihood of success or failure (consideration of pros and cons) when executing the plan. If the value gain is clearly expected to prevail, the intention to execute the plan results. This can happen at an earlier or a later phase of plan elaboration depending on how favourable or unfavourable circumstances are and how many personal and instrumental resources are available.

The action plan and its value reference are fed into that part of memory that stores intentions, and each upcoming subtask is then called up as intended. It gives direction to the plan. Starting from any current state of plan execution, the intention is directed towards the next subgoal. Thus, each partial step is

anticipated and intended and executed in a controlled manner in terms of the intention. Control means control of results as well as continuous dynamic feedback control at the motor level.

An important characteristic of action plans is the degree of specification. It is important, on the one hand, for the assessment of feasibility and, on the other, for the degree of freedom in specifying subactions. The degree of specification is also important for the extent of exploration and improvisation "on site". Improvisations and emergency actions do not occur haphazardly; rather, results are controlled according to heuristic strategies.

4. Plan-executing actions as an activity of hierarchical systems with a pattern of instructions

Referring to the hierarchical-sequential structure of plan-executing actions, MILLER, GALANTER and PRIBRAM (1970) have made the case that any action can be described as a hierarchically structured sequence of *instructions*.

They understood "instruction" to be an anlogue to the command units of programming languages.

In terms of social psychology and administrative law, "instructions" are action mandates given by authorized people to those subject to directives. Such instructions are always given with a purpose arising from a plan. The execution of the plan by the recipient of the instruction is supposed to implement the plan pursued by the instructing party.

Generally, instructions are acted upon reliably in systems with well-established instruction competence accepted at all levels and having, at the same time, the character of a power structure. Its antipole would be a nonhierarchical community of people pursuing a plan they worked out together based on a division of labour they agreed on.(e.g. the on-schedule construction of a log cabin in the taiga before the arrival of Siberian winter). In this kind of cooperation, plan fulfillment requires that all community members commit themselves to achieving the task they took on in due time, powerful motivating factors in this context being the adherence to ethical principles as well as one's personal interest in plan realization and solidarity with the community.

Nevertheless, for the overall plan to be accomplished, a coordinating authority is necessary if, for instance, time requirements were wrongly assessed or unforeseen developments came up, so that with a delay in one area the entire scheduling would break down, in which case the division of labour would have to be rearranged. If that has to be done at short notice and workers focussed on their task do not have the overview of progress made in other areas, then a coordination centre is required, well-informed about the work progress, and community members must accept a subordinate role. Generally, that leads to an instruction competence pattern being established quasi through "self organization". It may have been "democratically" generated, but is not without leadership. If, however, the various tasks have to be done in a very small and

limited space, the required coordinating decisions can be made cooperatively. A historical example is the collaboration of six very different personalities as they steer their balso wood raft, built with Stone Age technology, from Peru to Polynesia. That was an endeavour carried out under the higher-ranking plan of proving it possible for culture to spread from South America to Polynesia (see HEYERDAHL).

Usually, systems with an instruction competence pattern are structured at various instruction levels. Since each instruction corresponds to a goal-oriented purpose, these man-controlled systems can be understood as multilevel-multigoal systems.[1] The concept of *multilevel-multigoal-systems* can also be applied to the economy, to public institutions, administrative organizations, the power and terror machinery of a despot, as well as to an orchestra acting as an acoustic body under the guidance of a conductor. Generally, it can be applied to all man-controlled systems. Among these, there is a special class of systems with the particular characteristic that the goals of all subactions are planned and intended hierarchically at all levels and subject to a dominant goal, e.g. in the cooperative construction of a log cabin or the escape action discussed above. Indeed, the latter could be carried out (and even with better chances of success) cooperatively with allocated roles.

If these functions are carried out by a single person, as in our escape example, the interaction of functions can also be understood from the angle of having the authority to issue instructions, actually issuing them, receiving them and complying with them. The actor in the role of captain has the task of planning in a coordinating manner and of issuing appropriate instructions. In this context, he must always keep the framework of his goal hierarchy in mind, even when he is executing functions at lower levels of the hierarchy. If the boat's position has to be determined, he will use the result to give a steering command in the sense of the superior purpose. If the actor is very proficient as a navigator, the act of navigating will no longer require coordinating planning, unless it were to coordinate navigation with his other tasks, e.g. direction steering and power regulation. If, however difficulties crop up during navigation, coordinating planning must again take effect, and the actor as captain must apply navigational skills. He must do so without forgetting his other tasks. The captain's "authority to give instructions" results from the actor's motivated determination to implement the superior plan or from the associated commitment he has made.

The analogy between the cooperative division of labour in steering a boat and an individual's way of doing so makes clear that the human *individual* with his action competence is also a psychophysical *multilevel-multigoal-system*. In the physiological domain, the different functional levels are the level of molecular biology, above that the level of cell organization, above that the level

[1] On the term of "multilevel-multigoal-system, see M.D. MESAROVIC, J.L. SANDERS, C.F. SPRAGUE 1974; on the application of this term in social psychology, see v. CRANACH et al 1986. More detailed information in Chapter ??)

of organs, and above that the level of an organic system including its central physiological coordination. Above these physiological levels, at the next higher-ranking levels of functional integration, control is effected according to the action plans, intentions and motives stored in memory and called up from there. These functional levels are levels of activity in accordance with the hierarchical-sequential organization principle of action (see HACKER 1988, also Part Three above)

The action plan for a job application is a good example of the psychophysical hierarchy of action control. According to this plan, the actor goes for an interview. On entering the office building, he finds himself confronted with the following alternative: to walk up the stairs or take the elevator. Relative to the superior application plan, this is a decision at a relatively low level of integration, but above the level of organ coordination. According to the action plan "walking up the stairs", the actor controls the necessary sensomotor behaviour through which, at the level of organ coordination, the frequency and volume of the heartbeat as well as the frequency and depth of breathing are automatically regulated, so that the amount of oxygen required for the energy it takes to climb stairs is provided. These processes in the psychophysical domain might give feedback that intervenes in action control and adjusts it. Thus, the actor might realize that, when climbing the stairs, he is short of breath, and (as the machinist) he will regulate his effort by reducing his pace to avoid being short of breath at the interview.

This example of regulating the climbing of stairs is a clear demonstration of how human subsystems characterized in physical and psychological terms interact.

In this illustration of action cybernetics, the information that influences control at the level of psychic action control is reproduced in the context of conscious experience, which is indispensable in spite of the nerval coding of action plans we may expect to be stored in memory. Nerval coding is only comprehensible as a coding of data pertaining to a conscious intention when storage occurs. The same applies to the nerval coding of perceptions to be understood as an action-controlling picture of reality, to which the actor adjusts his plan execution. In this sense, the scientific description of information that influences control in the context of conscious sensory perception is indispensable for understanding action-controlling reality adaptations that purposeful actions reflect.

5. On the motivational and intentional dynamics of action control

In the concept of action control described above, the motivation for selecting a goal was taken into account, but it does not seem to be part of the model for the hierarchically-sequentially controlled execution of the action plan. Therefore, the first authors of a hierarchical planning concept have constructed an action model which they explicitly denote as "non-dynamic" (MILLER, GALANTER

and PRIBRAM) 1970). HECKHAUSEN criticises precisely this disregard of dynamics as the "action hole of motivation". Indeed: without considering a dynamic dependent on the strength of motivation, it cannot be understood why the actor should pursue his various intentions with varying degrees of tenacity, with more or less effort to overcome obstacles, with more or less perseverance and, last but not least, with different preferences regarding contrary interests, goals and intentions.

Therefore, we need to elaborate the dynamic aspect of hierarchical-sequential action control.

The dynamic aspect becomes manifest not only in the execution phase, but also in the phase between intention and execution and in periods of interrupted action.

In both phases, the dynamics are manifest in a sensitization for the perception of plan-related objects, a sensitization corresponding to the strength of the dynamics. These perceptions provoke plan execution or the resumption of interrupted plan execution (see LEWIN 1926), i.e. in the sense of reactivating intentional energy and, consequently, the tendency to resume the interrupted plan execution. The dynamics are also manifest in the fact of remembering with comparative ease everything one needs to know to solve the problem (NUTTIN 1967) as well as one's preference for remembering unsolved rather than solved problems (ZEIGARNIK 1927). These effects of a latent intention were verified in terms of experimental psychology using the method of interrupted action. They show the potential of the stored intention-motive-system. That was Kurt LEWIN's actual reason for denoting a latent intention as a "tension system" that can be activated.

Among the manifestations of the tension system in the action execution phase, there is in particular the influence it has on regulating efforts to cope with obstacles. This influence is discussed in a separate chapter in connection with pertinent experimental findings. In the context of the hierarchical-sequential structure, effort regulation as well as the entire dynamics are dealt with using the example below.

The actor, as for instance the refugee from a dictatorship, starts from a strong desire and specifies his goal. He has worked out a promising action plan that he expects will lead him from his current situation to his future goal. Moreover, the actor has considered or eliminated all doubts to the extent that he can now make the decision to execute his plan. He has sufficiently concretized the sequence of steps in his undertaking and memorized them by way of precaution, so that the action plan has been fed into intentional memory and is ready to be called up i.e. in its subjective importance for realizing the desirable goal.

The decisive aspect here is that the hope to obtain freedom and security outweighs the anxiety about the consequences of failure. Or to put it more

accurately: the expected value gain multiplied by the probability of success outweighs the expected value loss multiplied by the probability of failure.

Since value gain and value loss compared to the value level of the current situation (danger of imprisonment) are determined, what results is that executing the plan is preferable to abandoning it. Thus, the action plan is stored in the intentional memory not only as an intended, but also as a value-balanced plan.[2] What is true for value balancing in relation to the overall plan is also true for value balancing with a view to the subtasks involved, depending on their importance for the overall plan to succeed.

The decisive factor for plan execution is the expected value gain with regard to solving each upcoming subtask based on an increase in the likelihood of success or a decrease in the likelihood of failure for the entire project. The other decisive factor is a decrease in the expectation of success as well as an increase in the expectation of failure as a consequence of not solving the respective subtask.

Such a subtask-related balancing of values is done *expressis verbis* with unexpectedly difficult and dangerous subtasks, where the actor is faced with the question whether it is better to give up and, at the same time, has to consider what is at stake. Upcoming subtasks the actor was prepared for are intended as subtasks in the sense of plan-related intentions without explicit motivational reflexion.

This transfer of motivating expectations to subtasks, denoted as value balancing, makes it possible to keep up intentional energy until the entire project has been completed (see the term of "motivation maintenance system" coined by KUHL). On the other hand, the possibility of a rebalancing of values, as discussed above, in an unexpected phase of plan execution may well allow for the modification of the action plan. In particular, it may allow for a retreat, unless the actor has deliberately burnt his bridges behind him

In summary, we can say that the dynamics of plan-executing action in terms of the specified manifestations are the stronger, the larger the value range is between the anticipated negative value of failure and the anticipated positive value of success. However, this is a simplification not considering sufficiently the different effects of fighting against failure and of striving towards success by means of appetence motivation. According to the two-component-model of motivation, the issue arises of how the aversion-motivated reluctance to accept failure affects action plan execution, considering the appetence-motivated striving for success as well. There are several answers to this question.

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[2] The correct term for the memory that affects control would actually be "intention-motivation-memory", since the motivation as well as the intention are stored. In literature, we find the term "working memory" apart from "intentional memory". "Intentional memory" is understood mainly in terms of the psychology of will, whereas "working memory" is taken by DÖRNER to mean an intentional memory with a stored strength vector of motivation, i.e. an intention-motivation-memory, as well.

HECKHAUSEN, for instance, makes the case that the actor, having decided to execute his plan and acting resolutely, acts as a partisan of his own determination and suppresses anxious thoughts and misgivings, thus weakening their effectiveness.On the other hand, ATKINSON makes the case that an aversion against failure, i.e. fear of failure, represses action in the sense of disrupting concentration on upcoming subtasks by focussing too much on test evaluations, thus possibly raising compulsive thinking about failure to the point of a total blockade.

HECKHAUSEN, BIRNEY and FUCHS make another case: the actor usually following the principle that the most effective way of avoiding failure was to try and succeed with all one's might and full concentration, so that the reluctance to accept failure can be an additional incentive in this effort.

A fourth kind of effect the combination of both components has is the careful planning of an undertaking by training the required action competence, acquiring the necessary knowledge, repeatedly conducting test evaluations during plan execution and, if necessary, using tools for safety purposes. Thus, trapeze acrobats provide themselves with a safety net and extreme mountain climbers do precautionary training and provide themselves with pitons and ropes.

All kinds of interaction between both components occur in practice and are generally well-known, as emerges from many TAT-stories and personal questionnaire details.

Most actors are also familiar with the blockade of action competence because of anxiety. Instrumental-rational methods to avoid failure are used to reduce dangers, but also to reduce anxieties about failure that interrupt the action. This discussion leads to the concept of a regulative anxiety control, which is of central importance for coping appropriately and courageously with the risks of life (see FUCHS 1976a and LANTERMANN 1985). To the extent that anxiety about failure is a well-founded real anxiety, the methods of danger reduction mentioned above can usually regulate it down to a level where the development of action competence is not compromised, but rather enhanced. But if the regulation does not succeed, e.g. in neurotic fear where the actual reason for that fear is repressed, there will be a conflct between the two components.

This conflict becomes manifest in the damage done to action competence through excessive control and, in extreme cases, through a blockade of action coordination owing to anxiety and paralysis. Such forms of actions being disturbed are always the result of a breakdown of anxiety regulation. A breakdown which is a particular strain if a retreat from the danger area is obstructed or dangerous and intimidating itself.

On the other hand, it is important for anxiety in the danger area not to be turned off entirely, e.g. because of alcoholization, but to stay effective and

provide regulatory motivation through appropriately careful and circumspect behaviour.

***Summary*:** Every planned undertaking of an actor is based on an intentional tension system generated by action planning in terms of means-to-an-end orientation and the balancing of values and non-values and is stored in the intentional memory. Its strength becomes manifest in the execution phase as self-restraint, effort, concentration, perseverance and the readiness to suffer want, so that internal and external obstacles and risks can be overcome. What is at issue here are the manifestations of the concentrated ambition to achieve a goal and to prevent or repel failure.

The strength of the ambition consists of both components and is significantly determined by the value range inherent in the system between the appetence value of goal realization and the aversive non-value of failure. Both components are stored as value knowledge and an emotional reaction potential which becomes intentional as well once the intention has been generated. Together, they are the decisive system of reference for the importance of subtasks.

Knowledge of the value range can be deliberately called up and expressed in language form as an answer to the question the actor was asked about how important goal realization or failure were for him. As an emotional and volitional reaction potential, the value range with its competing appetence and aversion factors can be emotionally activated and quantitatively assessed by means of cues linked through association. This can be done because of the effects of activated emotions (depending on their strength) on the imaginative interpretation of images and forms or the failure (depending on its strength) of an effort that was to be carried out in a focussed manner.

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Elmar A. Stuhler*

The Usefulness of Action Psychology for Multipurpose Agribusiness

Analogy

Examples of psychological activities and processes are perception, thinking, learning, empathy and memory.The preceding essay, the example of an escape presented by R. Fuchs (1995), illustrates how psychological knowledge is used to plan an escape from a dictatorship into freedom with the help of a sailing boat. Could not – analogously – planning and controlling of goals and sub-goals in agribusiness processes successfully contribute to the implementation of an action plan for an agribusiness sub-system such as a farm? The drafted example below provides a basis for that consideration. We are talking about a small farm business operation and its relations to governmental organisations, its dependencies on farm input supplies as well as sales of produce to processing companies or consumers, nature and climate.

Both examples are directly concerned with the major topic of sustainable development (in short: sustainability). As for planning the escape into freedom, social and physical processes within sustainability were involved. As for the small farming business just mentioned, what we are dealing with is the purchase of farm input such as equipment, machinery, fertilizer, etc., production, and sale of produce such as foodstuffs, in particular, as well as the preservation of the man-made environment of a region. From time to time, adjustments have to be made, and it is not only nature, not only the market, but quite often there are also political influences or the entrepreneur that bring them about.

This small farming business project is located not far from the district where William Lang spent a part of his childhood. That was during the last year of World War II and the years of famine that followed. Helping out every day in farming and having to face other squalid economic and socio-political circumstances of the times, William Lang was motivated to commit himself in the farming sector of the economy and way of life. Later on, this motivation influenced his choice of a field of studies and his professional work. “Motives describe a disposition to classify certain kinds of action goals in a certain way” (Häcker, Stapf, 2004)..

At the end of the sixties, William Lang was working at an institute for economic and social research at a German university. From the beginning, he tried to find out about the time he would have available and the material conditions required to run an experimental, biologically managed farming

* Stuhler, Elmar, A., Dr., WACRA EUROPE e.V., Hochackerstrasse. 07, D-85356 Freising, Tel +49/(0)8161-66767, E.mail: stuhler@wzw.tum.de.

business. William Lang, at the end of the sixties, did not succeed in getting support from his university for a similar research project. His boss at the time said that was nothing to write home about, i.e. the required financial funding and other kinds of support would never be given for bio-oriented research.

Through studies at Yale University, William Lang learned about thinking within the agribusiness system. Farming is a part of agribusiness. Agribusiness is defined as "the sum total of all operations involved in the manufacture and distribution of farm supplies; production operations on the farm; and the storage, processing, and distribution of farm commodities and items made from them" (Davis, J.H., Goldberg, R.A. 1957). – "While the name Agribusiness as an academic subject had its origin in the United States, the origin of the concept is more accurately rooted in the developments throughout the world in which we live. The commercialization of agriculture and the related food and fiber industries, which has been greatly accelerated over the past 75 years, has required a new look at total vertical commodity complexes as well as at their component participants." – Agribusiness, therefore, is upon us; it is not something we invented, except as a concept to bring our thinking up to date with reality." Henry B. Arthur, (1975). It was not suggested that the concept of agribusiness should be applied. It was treated accordingly in research, teaching and politics in Germany. Recently, one has observed that the concept of agribusiness is applied more often in these fields.

At the end of the eighties, William Lang had the opportunity to lease some agricultural land to operate a small open-air, organic farming business as a casual farmer, about a hundred kilometers away from his university institute. There were no farm buildings on the land. In the late summer of 1989, the lease agreement was finalized. William Lang was able to build up and observe that small farming business with an interdisciplinary approach. The affordable basis for the analysis was diary writing as precisely as possible., i.e. not only economic and social issues relating to the business were recorded (first dimension). Facts on environmental protection and ecology were included simultaneously (second dimension). Psychological aspects should not be forgotten, i.e. almost everything the actor thinks in the context of planning, acting and action control, why and how he acts, as well as socio-psychological aspects regarding the interaction with other people as, for instance, contractors and other farmers cooperating in machinery pools and with support services. When asked, they help out with machines and human labour (third dimension). Finally, the well-being and health of the entrepreneur are at issue, even if he (William Lang) does farming only as a part time farmer (fourth dimension). This means that more than 50 % of income are earned in another system. The reader will easily understand that such an approach demands interdisciplinary procedures.

A short comment on the longitudinal case study as a research method: The discussion about the benefit or value of longitudinal case studies (casuistry) as a

means of achieving specific research objectives began in the seventies in social and medical sciences. Other disciplines followed later on. Longitudinal case studies are used with different intentions. They make it possible to observe and describe a person's individual behaviour or that of a group and their interaction with a system over a long period. Observations can be systematically analysed over time. Ultimately, conclusions can be drawn regarding the underlying processes. Moreover, psychological processes can be examined and projections developed for the future. We cannot address other, more differentiated views of the value of case studies in this context (Petermann 1989). At any rate, the unit to be examined can be a single person, a homogeneous group of people or a complex economic or social system, such as a town or city. That notion is usually combined with another notion, i.e. that of an actor interacting with or intervening in a system. It can be farm.

The Vision at the Outstart

The vision William Lang had at the outstart concerning the biological orientation of the small farm business was influenced by the following event: to illustrate the development of rural culture, the head of the Museum of Monument and Nature Conservancy, adjacent to Lang's property wanted to have the example of a farming business with arable land, permanent grassland and rearing of suckling cows, customary lot size and for illustration of a three-field rotation (two times grain and one time clover) and a fruit-changing system (cereal and leaf fruit alternatively). The commodities were to be exploited in a useful way. Had it proved economically justifiable, the employment of historical working techniques and equipment would have been desired. William Lang was to implement the museum director's goals in his small business if the goals could be financed from the earnings of the business.

Since the beginning of the longitudinal case study, all costs of the farming business and its investigations had to be paid from the money generated through sale of farm produce. There have been no other (public) research funds available so far. However, William Lang applied for subsidies to be able to cultivate his land according to existing programmes of the European Union, the Federal Republic of Germany and the Free State of Bavaria. Just like other farmers in similar natural and economic conditions, he was granted subsidies from various support programs using funds from the European Union or regional ones.

Historical and Cultural positioning of the "experimental" farming business

Alternative one: "Closed Home Economy"

That category of farming practised in the middle age was a version of organic farming. Nevertheless, the small farming business William Lang set up cannot be seen as a "Closed Home Economy", mainly because it has relations to markets. From the business management point of view, the "closed home economy" was hardly more than the acquisition of food for one's own needs.

(1) There was no appreciable connection to the market.
(2) Equipment and management were geared almost entirely to meeting the needs of the farming family.
(3) Businesses like that stood in the context of poorly developed cities, a low standard of living throughout and hardly any possibilities to sell their products.
(4) The economic responsibilities of a self-supply economy were the exploitation of natural land productivity to meet the needs of the family and provide cash.
(5) In this development phase, there were no aspirations to maintain or improve soil fertility.
(6) Business organization was quite one-sided: branches of the business did not mesh; there was a certain diversity in land cultivation with plants being raised for nourishment and clothing and other basic commodities; farming families were involved in handicrafts.
(7) Before rules forcing farmers to cultivate certain crops only were abolished, individually organized cultivation was not possible (crop rotation, livestock farming). In communities and entire regions, the organization of agriculture was standardized. Specific natural and economic conditions of a location were not considered.
(8) Success was measured in terms of money earned. A desire to expand the business was rarely observed. Because of overpopulation, it could not be implemented anyway.

Alternative two: Market Oriented Farming

As to the market-oriented, more sophisticated farming that followed later:

(1) It is characterized by a growing demand for food caused by the beginning industrialization, rising agricultural prices, decreasing prices for agricultural equipment and rising agricultural spending power. There were incentives for farmers to sell more products and use more equipment. The ambition was to adapt the business as well as possible to the given natural and economic conditions of a location.
(2) Individual farming businesses had developed, and the actual "sophisticated farming" begins. The emergence of individual businesses was characterized by measures taken to maintain soil fertility, humus and calcium supply for fields and the growing of certain plants (legumes, different kinds of clover to improve the soil and produce field fodder).
(3) Intensive farming of the new kind (more resources, veterinary care, concentrates) is made possible because of the technical and organizational progress resulting in increased productivity of soil,

animals and plants, particularly by expanding the growth of intensive crops and raising the number of productive livestock, limiting extensive fodder production (pasture land etc.) and increasing the Crop growth ratios and productive livestock density per 100 hectares of farmland became important parameters. Intensification affected farmland productivity: by 400% in the period from 1818 to 1960 harvest per surface unit thereof.

(4) However, intensive farming is more susceptible to risk than extensive farming, especially the more closely connected to the market a business is. This applies especially for Germany.

Searching for a sustainable market economy

Background

On the basis of alternative two from 1989 to mid-December 1992, the available area of approximately 13 hectares was farmed without livestock husbandry. During those first three years, the business was not a hobby kind of undertaking. Rather, it was put in the service of the Museum of Monument and Nature Conservancy as well as a research project. It was a sideline business in the recreational area close to a town planned to yield sufficient profit over a longer period of time. In principle, this commercial business has stood the test. The Museum of Monument and Nature Conservancy as well as the research project benefited. The goals of both were linked to the higher-ranking goal of contributing to "sustainable development".

Farming problems included the control of weeds. When livestock farming was introduced at the end of 1992, what could be observed was that, especially for the first week after the birth of a calf, there was a disturbed relationship between some suckling cows and their offsprings. During the first week after the birth of a calf, it usually took many hours to find and implement harmonizing measures, e.g. by putting the suckling cow and its calf into a separate "box". It was necessary for the animals to learn how to deal with one another appropriately. Another big problem was to prevent or control parasites harmful to the cattle. At the beginning, the Department of Agriculture did not object to the year-round use of an animal shed newly built at the end of 1992. The costs of the shelter with electric fences, drinking troughs and a gravel bed amounted to about 20 000 D-Marks (about 10 000 Euros). There were additional costs of about 27 000 D-Marks (about 13 333 Euros) for buying 13 mother cows.

It is incomprehensible why the Department of Agriculture in charge decided after two and a half years that the so-called privilege for building an animal shelter in November / December 1992 was considered to be an unsettled transaction. The shed that William Lang built for suckling cows at the end of 1992 has less than 70 square metres. Therefore, it did not require a building permit – as the responsible authorities have repeatedly assured me. That had

been exhaustively discussed – with several officials! – before building activities were started. These officials regarded the privilege with favour. Mr. William Lang had heard nothing from the Department of Agriculture that might have been directed against the privilege. As the shelter had less than 70 square metres, a building application did not have to be submitted. Unfortunately, hardly a winter went by without visitors going for a walk to the constantly open shelter and being moved by the "freezing cattle" to the extent that they complained in the Museum of Monument and Nature Conservancy or the abbey and /or the veterinary office.

For the reasons mentioned above, William Lang's cattle were shifted from the shelter to Farmer Foxer's newly built open stable. It was the veterinary administration in charge that took the initiative, with the agreement of all other parties involved. The new and bigger open stable located at a greater distance was good for this kind of cattle breeding. The rent that had to be paid was in the range of what could be called a normal rent. Even so, it was not possible for William Lang to generate the annual rent with his small business. Debts accumulated from one year to the other. This situation led William Lang to decide that, as of the year 2000, he would keep his cattle in his own shed not only during the summer months, but also during the winter months. Some improvements were made, such as an enlargement of the concrete slab in front of the shed. Meanwhile, William Lang had been able to obtain the so-called privileged status for his shed – without submitting a building application.

After several years, the small business with only about 13.5 hectares of usable farmland, of which about 8.5 hectares were permanent grassland and 5 hectares were arable land, switched over to suckling cows breeding in 1992. William Lang bred suckling cows and sold the produced meat directly to the market, i.e. the consumers. The breed was German Simmental.

For economic and other reasons, William Lang began to ponder whether he should sell his own suckling cows and calves as well as youngsters at the end of 2006. His own suckling cows were grazing or just exercising (fresh air and enjoying more space to move in) all year round. Every day a cow man checked whether the suckling cows and their calves and youngsters were well, had enough fodder and water and salt stones plus mineral stones. William Lang hoped that the change to "hosting" suckling cows from other farmers in the surrounding villages in 2007 could help with less pasture being damaged during the wet weeks in winter and in early spring than during all- year- round management. "Hosting" cattle would insure that the pasture of his organic farm remained under his control. But it could be used by "hosted" suckling cows during the summer period, for which a daily fee per animal would be raised. That could only be done during the growing season from May to the end of October. During winter, the cattle would have to be taken back to their home cow sheds or stables by their owners.

The abundance of quantitative and qualitative data as well as their relations and networks of such a longitudinal case study are frequently presented in time series to give a detailed review of development. In the given context, however, we will confine ourselves to a look at one particular conflict. It refers to the common effort of the business management, on the one hand, and people from the neighbourhood interested in animals, on the other hand, to establish "humane and sustainable cattle husbandry". The conflicting points of view that ensued were resolved in court. How did that come about?

Claim of the County's Veterinary Office

The fourteenth winter of William Lang's business with his own suckling cow husbandry was long and cold. One day, two ladies and their dog visited the shed. One side was permanently open, both in winter and summer. The way the two ladies described it, a newborn calf was lying on the icy ground in front of the shed. They filed charges with the veterinary authorities. On March 18th, 2005, the authorities wrote to the cattle owner that – in execution of the animal protection law, the animal protection/farm animal husbandry by-law and the cattle transportation by-law – keeping suckling cows in an open-air shed, as William Lang had done, deserved a reprimand.

When the veterinary office did controls, they found several deficiencies pertaining to animal protection and animal disease laws in the farm animal husbandry in an open shed.

(1) The area for moving around in front of the open-air shed was very boggy. The animals must have a dry surface available to move around on. To provide relief, the best thing would be to relocate the suckling cow herd temporarily on some other premises till the ground has sufficiently dried.

(2) As of immediately, the freestall shed must be kept clean by mucking out the shed and renewing the litter.

(3) The cattle herd must be controlled through direct inspection at least once a day, making sure that all animals are provided sufficiently with feed and water and that feed and water are protected against weather influences, frost and moisture in particular, e.g. by means of roofing.

(4) Two approximately four-week-old calves have not been duly marked with ear tags. According to the animal transportation by-law, that must be remedied within seven days.

(5) After calving, calves must be cared for more intently in future. When it is very cold, in particular, calves must be sufficiently protected against heat loss.

In view of the urgency of the matter, you are requested to correct the deficiencies mentioned above at your earliest convenience and to contact the veterinary office immediately on receipt of this letter. Should the points

mentioned above not have been corrected by the end of the month, we shall take measures to protect the animals and to remedy the situation by official order.

About a month later, another letter arrived from the veterinary office, in which William Lang, due to the summary proceedings filed against him, was to come to a hearing as the person concerned.

Written Statement to the Association for Organic Agriculture

The Association for Organic Agriculture, Approval Commission, Agricultural Output Germany, of which William Lang is a member, summoned him officially to submit a written statement on these grievances and his further course of action in livestock husbandry no later than the end of April 2005. The statement was to be made regardless of whether William Lang intended to abandon livestock husbandry or not.

To Ms Waretzkova, Head of the Approval Commission

I will comment on the complaints as follows:

"General cruelty to animals in husbandry conditions (no water supply for animals, no dry feed racks – wet hay, newborn calf exposed to mud/liquid manure during the winter months".

The husbandry conditions in my business in Housefield are characterized by a freestall shed (permanently open on one side) with deep litter and a year-round space for grazing or exercising as well as the soil and climate conditions in the region of Augusta, Black Valey near Fronthausen. Basically, it is possible for my cattle "to act out their characteristic behaviour " (Organic Farming Guidelines, p. 13).

Seasonal transition periods, e.g. from a relatively long and cold winter to thaw and rainy weather, offer cattle specific "climatic stimuli". They can choose between a shed and an exercise space or, in the summer, a grazing space. With few exceptions, none of the cattle are tied down or hindered in their freedom to move (graze or exercise). An exception can be: veterinary treatment.

Bigger cows can provide themselves with water by means of a cattle-operated water-pump. Calves are suckled by the mother cows. In the winter, the water pump can be heated from below with one or, if necessary, two white oil sprays, so that the water doesn't freeze. Should the water freeze temporarily nevertheless, e.g. because the oil spray went out, then the animals are watered temporarily from a container. Water for that purpose is brought every day by Mr. Foxer, who looks after my cows. It can happen that, during the night, some remaining water the cattle did not drink freezes in the container. In the morning, the ice is smashed and new water is added. When the cattle can use the water pump again, with or without oil spray support, drinking from the container is no longer necessary. Basically, because of the two possibilities the cattle have, they do not suffer from a lack of water.

Two facilities are available for the feeding of hay and silage: the hay is dispersed in a quadrangular rack with iron sheet roofing bought in 1992 from the Texas Trading Company in Winvaly. The construction ensures that the hay remains dry, even if it should lie in the quadrangular rack for several days until the bales have been eaten by the cattle. Contrary to the allegation made, it seems unlikely to me that wet hay got into the rack or developed there. Even if it rains hard, the hay can hardly get wet in the facility described. I must admit, however, that I cannot check on all situations and developments on site every day.

The cattle are offered plastic-wrapped silage bales during the winter feeding period on a "multi-purpose platform wagon" (previously, in the fifties, pulled by horses and moving on rubber tires). Until recently, the "platform wagon" has not been canopied. As the silage bales get eaten relatively fast, we noticed that the quality of the silage does not deteriorate in spite of rain. As ordered by the Veterinary Department of the County Office in Augusta and in agreement with the Building Department of that County Office, the "platform wagon" has been furnished with provisional roofing. Other measures would have required a construction licensing procedure of about half a year's duration before anything could have been done construction-wise. The surroundings of the "platform wagon" were stocked up with gravel about two weeks ago.

Notification was given of the birth of a calf on February 28, 2005 (mother cow US 09 745 02364) and calf US 09 849 68627). Suckling cow and calf were taken to a partition of the shed by Mr. Foxer. Mr. Dameir, member of the machine and manpower pool, who occasionally helped out in my business, informed me on March 1, 2005, that people going for a walk had apparently seen a newborn calf lying outside in dung and liquid manure. The nonery and the municipal administration and other parties were informed. It seems unlikely to me that a calf born the day before would have slipped out of the shed. The anxious observers may have seen one of the twin calves born on February 2, 2005, outside the shed. The twin calves, by then four weeks old, were already used to spending time outdoors, alone or with their mother cow or with the herd, even if it was very cold or wet.

On March 2, 2005, I went to Housefield in the morning. Mr. Foxer and I tried to help the calf drink from the suckling cow. We were not successful. As we increased our efforts, the calf was kicked by the suckling cow. Therefore, I asked the veterinarian, Mr. Roddie, to come and examine the calf and its mother.

Mr. Roddie, at approximately 11:30 a.m., diagnosed that the calf had low body temperature. To improve the survival chances of the calf, and because the mother had not entirely accepted it (insufficient milk supply), the veterinarian recommended taking it to the local hospital for animals. I transported the calf immediately to the hospital in Luffenham and visited there the next day. According to the veterinarian's comments and my own impression, the calf was fully functional and healthy after a one-day-treatment. Later on, I offered the calf to Mr. Joe Fit from Bony. He showed interest and picked it up directly from

the hospital. As far as I know, the calf has meanwhile developed in a normal and good way.

"The space where animals can lie down is not dry"

The canopied lying area (6m by 10m = 60 square metres) for cattle is sufficiently provided with straw or other comparable material. It is regularly replenished. However, after properly spreading the material, it eventually cannot absorb the moisture and cover the area as well as at the beginning. In other words: the need to replace the material increases. For instance, after a heavy shower, the cattle coming in from outside might bring additional moisture into the shed or onto the paved-over space in front of the shed. Thus, the overall picture of the lying area deteriorates rapidly and considerably. However, for reasons of labour management, the area cannot be replenished at just any time for the benefit of the cattle and sympathetic people interested in cattle husbandry. In certain phases of the outlined "cycle", people might discover every day that the litter has to be renewed depending on rain, the manner of feeding etc. Nonetheless, the cattle usually have enough time to rest and ruminate on fresh and dry or reasonably fresh and dry straw. I have repeatedly observed that some cows lie down in the snow-covered exercise area and ruminate there, even though the shed offers sufficiently dry lying space.

"The animals are apathetic and ill or neglected."

Even during the cold winter days, the animals did not behave in an apathetic, but in a normal way (eyes, rumination, reaction to people approaching etc.). Assuming that apathy means unresponsiveness and indifference towards people and surroundings, that does not apply to my cattle. Even during the period of snow or when it started thawing and raining, I observed that the animals fed, moved around or, as mentioned above, stood or even lay in the snow-covered exercise area or in the wet grass of the spring grazing land. Even in those conditions, they felt good. They have a winter coat! It is not true that they are "ill". Admittedly, a suckling cow lost the sight of one eye through a mechanical influence more than five years ago. A tumor developed at the eye gone blind. It has received veterinary care since the autumn of 2004. This year again, the suckling cow has given birth to a calf without human help. The last veterinarian examination and prophylactic treatment (against parasites) of my cattle took place on January 12, 2005. Without any noteworthy findings!

For various reasons, the cattle cannot be brushed and curried every day. But there are posts in the exercise area where they can scratch themselves, and they do. An occasional "shower" for the cattle depends on rainfall and the animals' behaviour. During periods of rain, it cannot be avoided that, at the borderline between paved area and pasture, cattle trample the turf and might have to move through mud. No animal got ill or weak because of that.

"Liquid manure runs above ground into nearby bodies of water."

I think the claim of liquid manure collecting above ground and running into nearby waters is untenable. Basically, when deep litter is produced, the animals' urine is soaked up by the dung piled in front of or within the shed and by the fresh straw. This year's dunging of the shed (April 15, 2005) showed me that even the big construction excavator employed had to struggle to remove the compact dung, which was by no means wet and soft. Accumulating dung is no source of "streams of liquid manure". However, when the snow melts or it rains for longer periods of time, it may happen that liquid similar to liquid manure leaks from the paved platform in front of the shed or a field dung heap. Possibly, a litre of urine and 10 to 15 litres of rainwater give 11 to 16 litres of liquid similar to liquid manure. Who is accurately informed about the urine concentration of such a liquid? For as long as the shed has existed and I have kept Simmental suckling cows, I have not been able to observe during any vegetation period that "liquid manure", due to its "above ground flow to nearby waters", has produced the liquid manure side effects well-known in agriculture: clearly recognizable, marked-off grassland of a more intensive green colour because of the liquid manure compared to grassland not affected by liquid manure (nitrogen effect on the growth of grass).

Sustainable Development as a Concept and Conflict Potential

Throughout the seasons, my Simmental cattle can act out their characteristic behaviour for many days. They would probably be envied by a great number of other cattle in our country if they could compare their living conditions with those of my cattle. Of course, there are days every year in Housefield that offer special, direct or indirect climatic stimuli. My cattle can cope with effects and demands caused by these, e.g. trampled turf, mud and/or puddles of water. Cattle kept as we keep ours in Housefield are prepared for such conditions. Generally, they can cope with them without infirmities resulting or damage caused to their health. That has been proved during the last twelve years of Simmental suckling cow husbandry in Housefield.

In my situation, the main problem is not lacking preconditions or excessive demands directly related to the lives of cattle. Rather, it is the lack of information among visitors, their awareness and their value systems. These are probably geared more to the living conditions of pets than to those of cattle living predominantly on the open land. What can we do to get people to move away from false images that determine their actions as, for instance: all animals need, at least during the winter, a warm dry snuggery? Sustainable development, in the sense of considering simultaneously ecological, economic and social aspects, implies that cattle are enabled to live, to a large extent, in the characteristic ways of their species. That can happen with simple means and, in my case, is given. Not every farmer can offer that to his cattle. Wherever "acting

out the characteristic behaviour of the species" can be supported, it should be done and not hampered or prevented by "visitors' interventions"!

Why shouldn't it be possible to motivate the protesters to cooperate in the effort to achieve "Sustainable Development"? If it is desired, I am always available for relevant discussions and for illustrating my points with pictures taken at various times of the year in Housefield.

Statement from the Office of Public Prosecutor in Augusta, 21.10.2005

Dear Mr. Lang,

I have dismissed the preliminary proceedings against you under the order of November 17, 2005, pursuant to Section 170, Paragraph 2, Code of Criminal Procedure.

Yours sincerely,

A. Smith

Counsel for the prosecution

Through Mr. A. Smith´s decision the conflict seemes to be resolved, officially at least.

Application of goal oriented action: the interaction of process components in terms of cybernetic theory along the lines of the previous paper by R. Fuchs

The psychological theory of R. Fuchs seems to be beneficial for planning, acting and controlling, including the assessment of risk and possibilities related to sustainability. It could contribute to bring disciplines together. Its applicability is worth testing in the agribusiness system as well as in other systems or sub-systems of our civilisation (see and compare papers in this book in part 1 –9). Let us go back to our case.

From now on Mr. William Lang wants to test the applicability of the above theory. On the basis of William Lang´s experience and observations of his farming system during 1989 – 2007, he will soon enter a new planning, acting and controlling phase. A new action plan for the period from 2008 – 2012 must be developed. In 2012, a new contract between the landowner and tenant will be negotiated. All measures are taken in the attempt to cover annual costs and the long-term debts accumulated during the previous farming period.

Moreover, the farm business should further contribute to sustainable development of the regional agribusiness system as well as to the overarching system earth. One of its most important parts are the renewable resources of agribusiness, including water and water management, not forgetting the effects of the Climate Change System.

A short accounting overview of the financial year 2006 / 2007 shows: The total operating revenues were 15 236 Euros and the total business costs 16 362

Euros. In that period, the government subsidis amounted to 8589 Euros. The net loss for the financial year was 1126 Euros (before tax) The loss was caused through repairs in and around the cowshed as a consequence of the complaints of two lady visitors and through the costs for legal advice. The long-term debts are ca. 9 900 Euros. The financial year lasts from July 1st to June 30th of the following year.

One main difference between planning, acting and controlling a (small) company related to sustainability and planning, acting and controlling an escape by means of a boat leaving a country with a dictatorship for another one with freedom and democracy is the duration of the project. The company, under the leadership of one entrepreneur, can last one or more generations. But it is not likely that the "captain" of the boat who intends to escape will continually attempt to escape by boat during his whole lifetime. It will be an attempt carried out in one or perhaps two years, but not longer. In the company of Mr. William Lang, four years must be taken into account. It should be possible to apply the theory to the farming area, inspite of the described differences of both attempts. It will be an effort, all in all, that includes many complex and dynamic problems and conflicts.

Last but not least: R. Fuchs does not rule out, for example, the introduction of the concept of "transdisciplinarity", i.e. for joint problem solving among science, technology and society (J.T. Klein, 2001). The term is new. The concept, however, has a long tradition of dealing with concrete problems in society. It is not only open to transdisciplinarity but also to other concepts and ways of researching and learning.

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Elmar A. Stuhler*

Retrospect and Prospect

Retrospect

WACRA1[1] evolved out of an attempt, in the form of a model experiment, to assess the learning effects of case study courses using the Harvard Case Method, which was developed at the Graduate School of Business Administration, Harvard University, in the USA.

In case study courses of this kind theories, concepts and practical problems are integrated into a teaching programme which takes the place of conventional lecture methods. Lecture courses are substituted by case study courses.

The method forces students to come to grips with complex and poorly-structured problems, while the conventional lecture methods imparts ready-made knowledge of solutions to well-structured and far less complex problems.

Those who are interested can read our findings in a volume, co-authored by the present speaker, entitled 'Research on the Case Method - In a Non Case Environment'.

This milestone event led to the establishment of WACRA in 1984. In due course this was followed by the establishment of WACRA AMERICAS in 1989 and WACRA EUROPE e.V. in 1991.

The focus of this organisation is on the thinking, planning and action of human agents, individually and collectively, in complex and poorly-structured situations where they are obliged to process and synthesise information at interdisciplinary, multidisciplinary and transdisciplinary levels.

The quality of circumspect, balanced and sustained action regulation that can be achieved in these individuals and groups is an essential ingredient in determining the performance of enterprises, regional authorities and central government administration.

Years before the concept of 'Sustainable Development' was popularised by the UN Conference in Rio de Janeiro, WACRA was promoting a holistic approach to complex problem solving free from negative side-effects.

In the intervening years WACRA has outgrown its initial concern with the

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* Stuhler, Elmar, A., Dr. WACRA EUROPE e.V., Hochackerstrasse. 07, D-85356 Freising, Tel +49/(0)8161-66767, E.mail: (stuhler@wzw.tum.de).
Related to WACRA est. 1984 and

1 WACRA EUROPE e.V., WORLD ASSOCIATION FOR CASE METHOD RESEARCH AND CASE METHOD APPLICATION D-85356 Freising

learning effects of the Harvard Case Method in a Non-Case Environment. We now set our sights on human thinking and cognitive information processing towards sustainable life or sustainability.

That is in the hope of extending the model of human action (Fuchs 1995) and contributing at some future date to a new theory of complex problem solving, linking systems theory, behavioural theories, economic decision theory and others. Because research-based learning is at the core of this process, we must necessarily carry the process back into our academic programmes of teaching and research.

And because the environment and the related problem of sustainable development represent an issue of overriding importance for society now and in the future, WACRA EUROPE e.V. hopes, by drawing on its earlier experiences, to contribute towards solving problems and resolving conflicts in these areas of science, teaching and consulting.

In the latter context WACRA EUROPE e.V. has organised, wherever possible on a collaborative basis, the following projects in the form of interdisciplinary meetings:

* 1992, Cork, Ireland
  'Enhancing Human Capacity to Solve Ecological and Socio-Economic Problems'
  (Eds. Ó Súilleabháin, Stuhler, DeTombe, Rainer Hampp Verlag, Mering (Munich)
* 1994 Delft, The Netherlands
  'Analysing Complex Societal Problems - A Methodological Approach'
  (Eds. DeTombe and Van Dijkum, Rainer Hampp Verlag, Mering (Munich)
* 1995, Maribor, Slovenia
  'Environmental Problem Solving - From Cases and Experiments to Concepts, Knowledge, Tools and Motivation'
  (Eds. Vezjak, Stuhler and Mulej, Rainer Hampp Verlag, Mering (Munich)
* 1996, Munich, Germany
  'Complex Problem Solving: Cognitive Psychological Issues and Environment Policy Applications
  (Eds. Stuhler and DeTombe, Rainer HamppVerlag, Mering (Munich)
  Complex Problem Solving: Methodological Support for Societal Policy Making
  (Eds. DeTombe and Stuhler, Rainer Hampp Verlag, Mering (Munich)
* 1997, Madrid, Spain
  Sustainable Development: I. Some philosophical, ideological and theoretical views, II. Strategic views supported by measurement, modelling and/or simulation
  (Eds. Elohimjl, Stuhler, Parra-Luna, Rainer Hampp Verlag, Mering (Munich)

* 1998, Riga, Latvia
  'Coastal Management in States with Coastal Problems - Towards Sustainable Development - Concepts, Cases and Simulations'
  (Several publications by the Faculty of Economics and Management, University of Latvia)
* 1999, Kaunas, Lithuania
  Local Agenda 21 - Through Case Method Research and Teaching Towards a Sustainable Future
  (Eds. Ecimovic, Stuhler, Vezjak)
* 2000, Vipiteno, Italy
  Part 1: Stimulating and Managing Change Towards a Sustainable Future in an Integrated Europe
  (Ed. Ó Súilleabháin, Rainer Hampp Verlag, Mering (Munich)
  Sustainable Development: The Role of the Universities
  (Eds. Stuhler and Vezjak, Rainer Hampp Verlag, Mering (Munich)
* 2001, Vienna / Krems, Austria (papers in volume 12)
  Sustainable Development Through Research and Learning
* 2002, Brno, Czech Republic (papers in volume 12)
  Long-Term Responsibility and Sustainable Life - System Theory and Case-Based Approaches
* 2008, Maribor, Slovenia (publication in progress)
  SUSTAINABLE FUTURE through Long Term Responsibility Focusing on Uncertainty –
  Case – and Stystem theory – Based Approaches

Prospect

Our 19th International Conference, is entitled „Long-Term Responsibility for Sustainable Life - Systems Theory and Case-Based Approaches". Thanks to the kind support of the University of Technology, the City of Brno and the District Government of South Moravia, the venue this year is Brno.

The focus is on „responsibility" and „sustainable life" (sustainable development or sustainability). It is self-evident that various approaches are needed in order to promote these concepts at global, regional, local and individual level. In many situations one will have to engage in a 'learning by doing' exercise.

It would be more precise to speak of exercises to enhance "awareness, perception, thinking and application of new results of information processing".

Some authors argue, that one may, alternatively or perhaps additionally, have to engage in a 'learning to learn' exercise.

This is likely where one has to perceive, think and act in situations that are exposed to change over longer periods. The latter situation is surely applicable to our

key concepts and goals of ‘long-term responsibility’ and ‘sustainable life’, for in this situation both the will and capacity to attain ‘sustainable development’ may be called into question.

A new dimension of ethical responsibility was rendered necessary by the phenomenon of modern technology as incorporated in new devices with unprecedented and imperfectly known consequences. Consequential networks went, and continue to go, beyond the framework of the earlier ethics, which is still valid, but no longer adequate in the presence of the new technological devices. It now became clear that Nature can be damaged by technological interventions of human beings.

The concept of Nature as a subject of human long-term responsibility is fairly new. Man depends on the condition of nature. So far the anthropocentric aspect of ethics still tends to dominate. But the distance between these new technological interventions and their effects, the time length of the causal chains and the spatial extensions are usually greater than before.

The attainment of the key concepts and goals requires that we, i.e. every individual, modify or complement our ethical concepts (values), interests, motivation, attitudes and cognitive skills. Up to recent times ethics was essentially anthropocentric. The effects of human actions on non-human objects did not, as a rule, belong to the agenda of ethical inquiry.

In the past, as Hans Jonas (1989) has shown, good and evil results of human actions were usually sought only in close proximity to these actions. This was true of both time and space. The possible maximum distance of the effects from the related action were considered small and the control of the circumstances was viewed accordingly.

Therefore ethics was mainly concerned with relations between human beings.

The underlying knowledge did not necessarily have to be scientific or philosophical in origin. Given this situation, nobody tended to be held responsible for the unintended long-term effects of his or her actions. In this context there was no need for long-term predictions and long-term knowledge.

Moreover, one should not forget the possible cumulative effects. Traditional ethics works only with non-cumulative effects. Under the current circumstances knowledge has a new role. The gap between the power of prior knowledge of the effects of technological interventions and the power to act, generates a new ethical problem.

One of the central questions of psychology and epistemology is how we come to know the external world, i.e. how we perceive and learn in a situation exposed to long-term changes and transformations, whose effects we often fail to detect in the present and in the short term. There are two opposite extremes which may contribute to this failure.

The first such situation is characterised by serious information gaps. The other is a situation where the individual facing important decisions is immersed in a superabundance of information, which is difficult, if not impossible, to process. In

this context one is handicapped by the additional difficulty of integrating and synthesising information compiled by different disciplines and fields of research.

The deeper we probe into research-based learning, the closer we come to questioning the direction of the evolutionary process in which man and his natural environment are engaged, and the role of research into that process. A time comes when we must put research itself under the microscope. Some observations on this situation would seem to be appropriate at this point.

The border areas between the disciplines can be looked upon as a kind of fruitful no-man's-land. Here we must try to overcome language barriers between disciplines. You and I are aware that problems are not handed over 'oven-ready' to pre-ordained disciplines. They must be comprehended, structured and made transparent.

It can be seriously counter-productive to reduce the degree of complexity of problems simply to make them amenable to the kind of analysis that is specific to a particular discipline. We can learn a lot from ecology, which reflects the benefits of co-operation between the disciplines.

Ecology attempts to integrate a number of disparate epistemological approaches and to help in overcoming the gulf between the physical and the human sciences. We believe that environmental field-research-based learning can be used in order to explore processes of consensus formation, diffusion and integration.

We would argue that long-term responsibility and sustainable life (development) requires more than interdisciplinarity and even more than multidisciplinarity It requires transdisciplinarity We need a new kind of knowledge, a new awareness that can bring about what may be termed "the creative destruction of certainties".

That is to say, "old ideas, dogmas, and out-dated paradigms must be destroyed in order to build new knowledge of a type that is more socially robust, more scientifically reliable, stable and above all better able to express our needs, values and dreams." (Charles Kleiber, 2000).

"Transdisciplinarity is a new form of learning and problem solving involving cooperation among different parts of society and academia in order to meet complex challenges of society. Transdisciplinary research starts from tangible, real-world problems. Solutions are devised in collaboration with multiple stakeholders.

A practice-oriented approach, transdisciplinarity is not confined to a closed circle of scientific experts, professional journals and academic departments where knowledge is produced. Ideally, everyone who has something to say about a particular problem and is willing to participate can play a role.

Through mutual learning, the knowledge of all participants is enhanced, including local industries, business, and non-governmental organizations (NGO´s). The sum of this knowledge will be greater than the knowledge of any single partner. In the process, the bias of each perspective will also be minimized." (Hurni, Pohl, 2000).

We assume and hope that the World Thinkers' Forum, which was initiated by Dr. Timi Ecimovic, will be of transdisciplinary in nature, i.e. an application of what I

have just tried to describe with the definition carefully elaborated after a conference at the University of Technology at Zürich, Switzerland, in the year 2000.

In order that such a project be given sufficient momentum it is necessary that universities establish schools for interdisciplinary information processing and synthesis with autonomous research and teaching programmes. In the 18th century Wilhelm von Humboldt proclaimed the unity of research and teaching. Today we must go a step further.

If the complex and dynamic problems confronting the human race now and in the future are to be mastered, we must achieve the unification of integrative/synthesising research and teaching and of disciplinary research and teaching.

May I conclude by appealing to you to join forces with us in this endeavour, particularly in the interest of sustainable life and with a view to promoting interdisciplinarity and transdisciplinarity. Let our conference be a practical workshop in which we

* transcend the boundaries of our disciplines, taking with us the accumulated resources of these disciplines,
* combine our efforts in order to structure problems on a discipline-free basis,
* attempt to solve these problems in a discipline-free manner or, at least, try, in the words of Lakatos (1974), to shift the problem in a positive direction.

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Contributors.

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Abadjieva,Tzvetanka, Dr., University of Botswana, Department of Civil Engineering, Faculty of Engineering and Technology, P.bag UB 0061, Gaborone, Botswana, e-mail: abadjitg@mopipi,ub.bw.

Bartak, Richard, J., B.Agr.Sc.,CSc., Czech Association for Nutrition and Vegetarianism, Honourable Member of SEM Institute for Climate Change, K Netlukam 958, CZ 104 00 Praha 10 – Uhrineves, Czech Republic.

Bastic, Majda: University of Maribor, Faculty of Economics and Business; Maribor, Slovenia, e-mail: majda.bastic@uni-mb.si.

Bauer, Ingeborg, Dipl.Ing.agr, Bavarian Ministry of Agriculture and Forestry, Ludwigstraße 2, D-80539 München,
e-mail: Ingeborg.Bauer@stmlf.bayern.de), Presently: (ALF-AB), e-mail: Ingeborg.Bauer@alf-ab.bayern.de.

Brix, Emil, Dr., Botschafter, Federal Ministry for Foreign Affairs, Minoritenplatz 08, A-1014 Wien, Tel (+43/501150-3548.

Derner, Norbert, Prof. Dr. Dr. habil., Technische Universität München, Institut für Sportwissenschaften, e-mail: n.derner@ws.tum.de.

DeTombe, Dorien, J., Dr., Lecturer, Delft University of Technology, Delft, The Netherlands, e-mail: detombe@lri.jur.uva.nl.

Dobrowolski, Jan W. Prof. Dr., Department of Environmental Biotechnology and Ecology, Wydz. GGiIS AGH, AGH Open University, Sci. Council of the Goetel School of Environmental Protection and Engineering, 30-059 Krakow, Mickiewicza 30, Paw.D-11, Poland, e-mail: dobrowol@agh.edu.pl. dobrowol@uci.agh.edu.pl .

Ecimovic, Timi, Prof. Dr., SEM Institute for Climate Change, Korte 124, SI-6310 Izola-Isola, Slovenia, Tel ++386 5 6421 360,
e-mail: timi.ecimovic@bocosoft.com.

Fiedler, Jan: Institute of Power Engineering, Faculty of Mechanical Engineering , Brno University of Technology, Technicka 2, 616 69 Brno, Czech Republic, Fax: ++ 420 541 143 345, e-mail: fiedler@eu.fme.vutbr.cz.

Fuchs, Rainer, Prof. Dr., (Emeritus), Technische Universität München, Lehrstuhl für Erziehungswissenschaften, Tel +49-(0)8161-8627.

Garleja, Rasma.: University of Latvia, Faculty of Economics and Management, 5 Aspazijas blvd., Riga LV-1050, Latvia Tel: 7226654-w, 7334180-h.

Goldsteins, Aron, Dr. ing.sc., University of Latvia, Faculty of Economics and Management, e-mail: brigita14@lv.118.

Hersh, Marion, Dr., Lecturer, University of Glasgow, Department of Electronics and Electrical Engineering, Glasgow G12 8LT, Scotland, Tel: +44 141 330 4906, Fax: +44 141 330 6004, e-mail: m.hersh@elec.gla.ac.uk.

Homann, Sabine, Dr.: International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), PO Box 776, Bulawayo, Zimbabwe,
e-mail: s.homann@cgiar.org.

Karlsone, Ilga: University of Latvia, Riga, Latvia. e-mail: skards@lanet.lv.

Kirk, Michael, Dr., University of Marburg, Institute for Co-operation in Developing Countries, Am Plan 2, 35032 Marburg, Germany.

Kleparis, Janis, Lecturer, University of Latvia, Faculty of Economics and Management, Riga, Latvia.

Klestova, Zinaida, Prof. Dr., National Technical University of Ukraine (KPI), Institute of Veterinary Medicine of Ukraine, Pobedy avenue 36, 03056 Kiev, Ukraine.

Knez-Riedl, Jožica: University of Maribor, Faculty of Economics and Business, 2000 Maribor, P.O.B. 142, Slovenia, e-mail: Jozica.knez@uni-mb.si.

Krättli, Inga, Prof. Dr.med., Dr.phil., Collegium Humanum Switzerland, Im Bielti, CH-3983 Goppisberg, Switzerland, Tel 01141/27927-3770. e-mail: docuSwiss@spectrawb.ch), homepage: www.Collegium-Humanum.ch.

Kremr, Antonin: Statutory City of Brno, Czech Republic.

Leist, Karl-Heinz, (Emeritus), Technische Universität München, Institut für Sportwissenschaften, Munich, Germany.

Makarenko, Alexander, Prof. Dr., National Technical University of Ukraine (KPI), Institute for Applied System Analysis, Pobedy Avenue, 37, 03056, Kiev, Ukraine. e-mail: makalex@i.com.ua.

Melngaile, Aija, University of Latvia, Faculty of Economics and Management, Institute of Marketing and Quality Management, Aspazijas blv.5, Riga, Latvia, e-mail: aija.melngaile@pvd.gov.lv.

Misra, Sasi, Prof. Dr. (Emeritus:Indian Institute of Managment, Vastrapur, Ahmedabad, India), Now at Entrepreneurship Development Institute of India, Ahmedabad, Gujarat, India, Tel (91) (079) 23969153, 23969158 e-mail: ediindiad1@sancharnet.in.

Misra, Shalini, M.S., PhD Candidate University of California Irvine, Department of Planning Policy and Design, School of Social Ecology, e-mail: shalinim@uci.edu), Phone: 949-228-3673.

Mulje, Matjaz, Prof. Dr. (Emeritus), University of Maribor, Faculty of Economics and Business, Maribor 2000, P.O.B. 142, Slovenia, e-mail: mulej@uni-mb.si. .

Muvrin, Drago: Eko usmjereni razvoj, Eco Universal Revival, e-mail:drago.muvrin@hnd.hr .

Nengomasha, Zivayi, Dr., Department of agricultural Research and Extenison (AREXX), Matopos Research Station, Bulawayo, Zimbabwe, e-mail: ziimagadzire@mrs.gatorzw.co.uk.

Nicolopoulos, Philippos; Prof. Dr., University of Crete-University of Indianapolis, Athens Campus.

O Suilleabhain, Micheal, Dr., Senior Lecturer, University College, Cork, Ireland, e-mail: mosuilleabhain@iolfree.ie.

Raipulis, Jekabs, Pedagogical Highschool and Management of Education, Riga, Latvia.

Rischkowsky, Barbara, Dr., Food and Agricolture Organization of the United Nastions (FAO), Animal Production and Health Division; Viale delle Terme di Caracalla, 00100 Rome, Italy.

Rooyen, Andre van, Dr., International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Bulawayo, Zimbabwe.

Saksonova, Svetlana, Lecuter, University of Latvia, Faculty of Economics and Management, Riga, Latvia, e-mail: svetlana@lanet.lv.

Samorodov, Emil., Prof. Dr., National Technical University of Ukraine (KPI), Intellectual Systems GEO Ltd, Pobedy avenue 36, 03056, Kiev, Ucraine.

Schönstein, Isolde M., „ARGE Schöpfungsverantwortung“, Vienna, Austria, e-mail: argeschoepfung@utanet.at.

Sherry Chand Vijaya, Prof. Dr., Indian Institute of Management, Vastrapur, Ahmedabad 380 015, e-mail: viijaya@iimahd.ernet.in.

Steinbach, Jörg, Dr., Justus-Liebig-University Giessen, Department of Livestock Ecology, Ludwigstr. 21, 35390 Giessen, Germany.

Sicinsky, Michal, Dr.: Faculty of Applied Social Sciences, Department of Philosophy, University of Science and Technology, Krakow, Poland, e-mail: sicinski@uci.agh.edu.pl.

Skards, Ilmars, Prof. Dr. (Emeritus), University of Latvia, Latvia, e-mail: skards@lanet.lv.

Strazdina, Victor, Establishment of Higher Education at Rezekne and die University of Latvia, Riga, Latvia.

Stuhler, Elmar, A., Dr., WACRA EUROPE e.V., Hochackerstrasse. 07, D-85356 Freising, Tel +49/(0)8161-66767, e-mail: stuhler@wzw.tum.de.

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Vokolkova, Vera, Ph.D., Senior Lecturer: Department of Civil Engineering, Faculty of Engineering and Technology, University of Botswana, Gabarone, Botswana, e-mail: vokolkav@mopipi.ub.bw.

Wagner, Aleksandra, Dr., AGH – University of Science and Technology, 30-059 Kraków, Al. Mickiewicza 30, e-mail: awagner@uci.agh.edu.pl. .

Wenscheova, Dana: City Conception Division, Brno.

Zeppenfeld, Werner, Dr., WDR Weltweit (Westdeutscher Rundfunk Weltweit).

Zielinska, Maria, Dr. AGH – University of Science and Technology, Krakow, Poland, e-mail: mziel@uci.agh.edu.pl.

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